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THE AMERICAN SOCIETY OF CINEMATOGRAPHERS was founded in 1918 for the purpose of bringing into closer confederation and cooperation all those leaders in the cinematographic art and science whose aim is and ever will be to strive for pre-eminence in artistic perfection and technical mastery of this art and science. Its purpose is to further the artistic and scientific advancement of the cinema and its allied crafts through unceasing research and experimentation as well as through bringing the artists and the scientists of cinematography into more intimate fellowship. To this end, its membership is composed of the outstanding cinematographers of the world, with Associate and Honorary memberships bestowed upon those who, though not active cinematographers, are engaged none the less in kindred pursuits, and who have, by their achievements, contributed outstandingly to the progress of cinematography as an Art or as a Science. To further these lofty aims, and to fittingly chronicle the progress of cinematography, the Society's publication, *The American Cinematographer*, is dedicated

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John Arnold,
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A.S.C. will Officially Test and Approve Equipment

ANNOUNCEMENT was made last week by John Arnold, president of the American Society of Cinematographers, that this organization is entering upon a program of testing the various types of technical equipment materials and methods in the motion picture industry. These tests will not only include the professional cinematic and still field, but also the many things which are being made for the use of the amateur.

"While the American Society of Cinematographers has tested for its membership safety," said Mr. Arnold in making this announcement, "it is now our intention to go into this on a wider scale so as to have a definite record of everything in the way of equipment instead of merely a few articles as in the past, which were tested only upon request by a certain number of members."

This information has been available only to members, whereas, under our present plan it will be broadcast to the industry through the columns of THE AMERICAN CINEMATOGRAPHER.

In the magazine it will take the form of an approval by the Society which will permit the manufacturer, if he so wishes, to designate in his advertising as well as on the piece of equipment itself, that it has been approved by the American Society of Cinematographers.

"The tests will be conducted according to the claims made by the manufacturers and in compliance with specifications laid down by the Society for that type of apparatus."

"The engineers in the technical division of the American Society of Cinematographers will make these tests. Included in their number are some of the foremost engineers of the industry."

"These tests will not be superficial, but rigid, impartial and constructive, and will not be confined to photographic equipment, but will include sound projection, and other avenues of technical operation. These fields may be interpreted by some as being foreign to the cinematographer and the claim made that their jurisdiction should be confined solely to the camera and the laboratory. Should these two best operations be perfect they may still be made to appear inferior by either the sound or projection and even the screen itself. The camera is the basis of the industry. Without it there would be no motion pictures, therefore it naturally embraces every technical phase."

There will be no fee for these tests to the manufacturer. The Society will bear the entire expense, the only charge to

be borne by the maker will be the transportation of the equipment to the Society's headquarters and its return to the factory.

According to the plans these tests will be very thorough, entering not only into the performance of the article, but into the stability, lasting qualities, and operation. The tests will be comparative with another article of similar character only inasmuch as the maker's claims enter into that phase of it.

In the printed approval, however, no reference will be made to a competitive article.

There will be no general specifications written in advance for each type of equipment, that is, there will be no standard specification. An individual specification will be drawn up for each test, always keeping in mind the claims made for the article by the manufacturer.

"While the plan we are entering into is ambitious," continued Mr. Arnold, "still we have known for a long time it has been needed by the industry. In fact it was one of the fundamental ideas in the formation of our society a number of years ago. However, not until now have we felt prepared to enter into it on this extensive scale. It is needed not only by the industry, but also by the manufacturer. It undoubtedly will be received with a great deal of enthusiasm by many of the foreign countries depending upon America for equipment but who are not now in a position to recognize the orphan from the legitimate article."

"There are many hundreds of camera men throughout this country who because of their roving commissions cannot keep closely in touch with progress. There are also others in the allied branches who are dependent in many instances on whatever knowledge they can glean locally of an article, or through advertising claims."

"These tests and approvals will be a guide for them in making their decisions on the proper equipment for the proper occasion."

The first efforts of the technical committees will undoubtedly be in the amateur field, as that branch of the industry has had such a rapid growth and the changes are

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Camera-Department

the strictly departmental personnel—the executive and clerical staffs, and the mechanics, loaders, etc. who form a vital service of supply behind the men on the set.

It is not difficult to select a group of first cinematographers capable of directing the photography of a major studio's product. In a large majority of instances, these men are placed under contract by the studio and retained regularly because of their known artistic ability and production efficiency. But, however good these men may be, they cannot work at their maximum efficiency unless they are working with crews with whom they are familiar, and in whom they feel free to place implicit confidence. It is therefore vital to surround these men with a staff of subordinates which seldom changes from picture to picture, making vitally complete photographic units. In our own case, we have found it the best policy to do this, both for our own protection and for the interest of the various first cinematographers in question.

It is the same with equipment. With the short production-schedules now in effect, valuable time may be lost if the second cameramen and assistants are made to work with unfamiliar equipment and, despite the fact that all cameras and accessories are of standard design and make, there are numerous minor differences in operation, unimportant in themselves, but which nevertheless must be allowed for if a production camera-crew is to operate at full efficiency. There is, in addition, a highly important advantage to such a policy, for if each assistant is regularly working with a certain equipment, he will take personal pride in maintaining it constantly at its maximum efficiency. In our own experience, we have found many instances where assistants, knowing that they would regularly be working with a given equipment for a period of years, have devised special accessories to improve either the efficiency or the convenience of operating their equipment; some have even been known to spend their own money on such private experiments.

In any major studio, the problem of keeping the photographic equipment operating at maximum efficiency naturally involves the establishment of a well equipped camera-machine shop, staffed by trained camera mechanics and engineers. This shop is equipped to repair or rebuild all types of cameras, relying upon the local camera factories and factory-branches for parts only, and thereby effecting considerable economies in both time and money over the practice of depending upon outside agencies for such maintenance work. We naturally feel, too, that such work is best done by our own camera-shop personnel.

In actual practice, the maintenance of the studio's cameras is routine as follows: during production, it is the responsibility of the assistant cameraman to whom the equipment is assigned to keep the camera cleaned, lubricated and in perfect operating condition. If at any time during production, he detects any flaw beyond his ability to repair, the camera is inspected by the department head, and, according to the need, either sent to the shop for the necessary repairs, or repaired on the spot by a mechanic sent from the shop. In such cases, production is continued by the use of a reserve camera. In the event, however, that so many units are in work that no reserve cameras are available, the camera is often sent to the shop and repaired at night so that production may continue uninterrupted in the morning, and without the added expense of renting a camera from some outside source. In the case of Akeley cameras, which are used principally for special aerial scenes and which are generally the personal property of the Akeley special-

AT ANY time the efficient functioning of a studio's camera department plays a vital part in the efficient operation of the studio, but under the economic and other conditions now prevalent, camera-department efficiency takes on added significance. For, in the last analysis, it is upon this department that the burst of translating the studio's product from the abstract to the concrete—from intangible ideas to saleable products, rests. Obviously, therefore, the individual or individuals in charge of such a department are faced with two related problems, first, organizing the department in such a way as to ensure efficient operation, and second, insuring maintenance, procurement and experimentation in such a way as to keep both the personnel and the equipment of the department operating at maximum efficiency. All too little has been said or written about these important problems, therefore, though painfully conscious of my limitations as a writer and otherwise, I have been called upon to contribute some slight description of the methods and routine which we have found most useful at the Hollywood studios of the Paramount-Public Corporation.

There are, first of all, two phases to the question of organization: the matter of personnel, and the matter of equipment. In the days before the introduction of sound, camera-department organization was a problem largely of personnel, since the majority of cinematographers preferred to use their own equipment. What equipment was owned by the studios was rarely used except when extra cameras were required for mob scenes, and the like. The introduction of sound, however, brought about a radical change in this practice due to the special equipment needed, so that today it is almost unknown for a cinematographer to supply his own equipment for a major production. Therefore very far-reaching reforms have taken place in all matters relating to equipment.

The first consideration, however, remains the same: the procurement and maintenance of the department's personnel. This personnel is naturally sub-divided into two distinct classes: the actual operating personnel—the cinematographers, second and assistant cameramen, who are actively engaged in photographing the studio's product—and

Organization and Maintenance

by
Virgil E. Miller

Head of
Camera
Department—
Paramount
Studio

ists engaged for the making of those scenes, the facilities of the Studio's shop are available to the individual while in the Studio's employ. In some few instances, Akeley even may use the Studio's Akeley cameras rather than their own in this event, the man is called a day earlier, and given an opportunity to familiarize himself with the camera before commencing work on the actual production. Color cameras, of course, are usually the property of the firm whose color-process is being used, and their maintenance is contractually the responsibility of the color firm, which likewise supplies the operating personnel.

When companies work on location, away from the studio—even if it is only at the studio ranch—we have found that the best policy is to send a camera mechanic with the company. Then, in the event that minor adjustments must be made, the mechanic is on hand to make them quickly, and with the minimum delay in production-time. On distant locations, where the company is actually operating away from the studio for days at a time, and at such a distance as to preclude a timely return to the studio, it is by far the most efficient system to have a mechanic accompany the unit. On such locations, a reserve camera is always taken. Such locations almost invariably involve operation under unusual conditions, such as salt sea air, desert dust, and the like. If a camera mechanic is with the unit, there is less danger of camera-troubles due to these factors, since the mechanic is able to personally check the camera every night. In addition, with a trained mechanic in the company, the assistants are as a rule far more painstaking in cleaning and maintaining their equipment.

At the close of each production, the assistants are retained for an additional day to carefully inspect and check everything about the cameras used on that production. Whatever mechanical repairs may be needed are reported to the department head, and the necessary repairs are authorized by him, and carried out by the shop before the camera is again used on production. Here, the policy of keeping camera personnel and equipment together as definite units proves its value, for the assistants, knowing that they will be using that identical camera on their next production, are particularly thorough in their inspections, and do not attempt to conceal minor faults or damages which they might, under other circumstances attempt to conceal as mistaking against themselves.

In all of this maintenance work, detailed records are kept of the history of each camera, showing its condition, what work has been done on it, its age, and the cost of all repairs, etc. Thus we have on file at all times a complete record of the condition, history and cost of every equipment.

The studio has recently established an Optical Section, in charge of an expert optical engineer, in which all lenses may be checked and tested, and in which all the necessary optical maintenance may be done. In addition, this department is able to handle the procurement of such items as optical glass for camera-blinds, etc., as well as serving the entire studio in optical matters. While the section has only just been established, it is certain to prove of tremendous value to the entire studio and especially to the camera department.



Under such a system of operation as has here been outlined, it is naturally vital that those in charge be able to know exactly where every individual and every item of equipment can be located at any moment. For this purpose, daily schedules are made out, showing the location of every company, and specifying the name and number of the production, its location and call the camera personnel, and the exact equipments being used. These schedules are kept connected to the minute, copies are sent to the studio operations office, and posted on the call-boards in both that office and the camera office. This is especially necessary in the Paramount Studio, as the grip department is responsible for the heavy units of equipment used by the camera staff—the blimps, rolling tripods, perambulators, cranes, etc.

A further vital part of the efficient conduct of any camera department is experimentation. New accessories and new equipment must constantly be devised to meet the changing needs of production. This work is handled under the direct supervision of the head of the camera department, and executed, as may be fitting, by the camera machine-shop, the optical shop, or by the studio's mechanical construction shop. In the case of minor developments, the development and production costs are usually charged against the individual production for which the device is originally intended. In the case of devices slightly more costly, and definitely adapted to several productions, the charge may be spread over several productions. In the event that the development is a matter that will benefit the entire department in its operation, the charge is against the department's operating account. There is, however, a definite need of a special fund for research and experimentation, though, to my knowledge, no studio has ever established such a fund. In that case, all of the experimentation that is now undertaken and considerably more that is not, could be efficiently handled without imposing any burdens upon either production costs or departmental operating charges.

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Point to give the effect of light is shown in the set scene at right and at side of doorway at left of photo.

Lighting with Paint

by

Holt D. Lindsley

Head of Scene-Painting Department
R. K. O. Studios

MOTION picture-making is, to the cinematographer, "Painting with Light," to the scene-painter it is just the reverse. Sets are not painted merely to make them appear finished, but to definitely aid the cinematographer in his work of bringing them to the screen.

We have found, through many years of experience, that a cinematographer is able to work more efficiently—and therefore faster and more economically—on a set that is intelligently and photographically painted. As a natural consequence, therefore, the painting of motion picture sets has become an intensely specialized craft, differing widely from ordinary interior-decorative painting or from stage scene-painting, and accordingly making entirely different requirements upon its personnel.

In the first place, the studio scenic painter must, in addition to the inevitable ability with paint and brush, be possessed of a keen artistic perception, coupled with an acute sense of realism and a high development of the faculties of observation, visualization and memory. Lastly—but most important—he must have camera-sense in a very high degree, for he is painting, not for the eye, but for the camera. He must know how every color and pigment, every type of paint and mixture will photograph. He must know just how the set will look when the lights are turned on, and he must understand enough about lighting so that he can paint his set so as to coordinate with the probable lighting used and, in many cases, actually aid in the lighting.

The most obvious instances of "lighting with paint" occur, of course, in some of the European pictures, and in those produced by Roland West in this country. In these, the principal shadow-masses are often painted on the walls and floor of the set with black paint, so that these important parts of the composition are ready-made for the cameraman. All that is necessary is to arrange the general lighting of set and players so that it carries out the idea indicated by the painted shadows, thus, of course, giving the cameraman greater freedom in lighting his set quickly and then

being able to concentrate on lighting the characters. The reverse of this is often done, too—painting beams of light coming through windows, etc., especially in night-effect sequences on the floor of the set with white or aluminum paint. Similarly, it is often a great time-saver to paint the light from a wall-bracket on the wall behind the fixture. This, incidentally, has the additional merit of saving a spotlight which would otherwise be used to create this relatively unimportant spot of light.

But this is only the crudest and most obvious phase of "lighting with paint". Far more important is the scene-painter's opportunity to help the cameraman in creating an illusion of depth and roundness in a set by painting in many of the various little catch-lights which, if created by actual lighting, require so much time to obtain, and which are so vitally important to the perfection of any scene. Every cinematographer, for instance, invariably high-lights columns, to give the effect of roundness on the screen the same high-lights can be produced by a paint-brush, far more easily and quickly. Imagine, too, a set that has a series of arches extending back from the foreground pieces. Lighting them properly, so as to get exactly the gradations necessary to produce the right perspective, is difficult, but if we paint them in progressively graded shades of gray, we not only secure the perspective easily, and add depth to the set, but give the cinematographer more time to devote to lighting the rest of the set, and the all-important actors. Another aid is to paint the corners of the set dark, so that they stand out from the lighter-toned walls. This will permit the cinematographer to use fewer spots, and to let the general lighting take care of these details. It is possible, as well, to make sets appear much lighter than they actually are, by painting the top of the set darker, blending, of course, gradually up from the lighter lower portions of the set.

The use of forced perspective painted upon flat backings proved a very successful artifice in the American picture "Broadway," and in several more recent foreign films, especially those of René Clair, most recently, of course, "A Nous la Liberté," which utilized this to a considerable extent.

An amusing expedient, analogous to the proverbial gilding of the lily, is the practice of spraying the leaves of plants with crystal oil, to produce an artificial halation, which gives depth and brilliance to foliage. Another job for the argon is, of course, the artificial ageing of sets. The effects of age which can be produced in this manner are truly re-

Continued on Page 19

THE cameramen of Hollywood are the most remarkable group of artists it has ever been my good fortune to know. Their artistry is, of course, proverbial; so, too, is the fact that they are individually and collectively as fine a body of gentlemen as one could meet anywhere. But to me, the most remarkable thing about them is the fact that there seems to be absolutely no professional jealousy among them. In no other artistic group that I have encountered, either in the theatrical profession or out of it, have I found such absolute freedom from professional envy, and such a remarkable spirit of cooperation.

In practically every other field of art, achievement is an intensely personal affair, but the cinematographer seems invariably to strive not alone for personal glory, but for that which will most greatly benefit his fellow-cameramen and make each picture (his or another's) a better one. Each cameraman seems genuinely proud when one of his fellows scores a success, and is sincerely sympathetic when one of them receives a set-back. This spirit alone is enough to make those men stand out as an unique group in any walk of life, but even more wonderful is the spirit of co-operation which pervades the camera profession. There seem to be no professional secrets between cameramen. If one man devises a piece of equipment, or a trick of lighting, which may be helpful to his fellows, he does not guard it as a personal treasure, but freely passes it on for the good of all. Frequently on starting a picture with a strange cameraman, I have soon the men who have worked with me on other productions volunteering advice as to the angles, lightings, etc., which they have found to be the most advantageous in photographing me. Among no other professional group have I ever known of such a generous co-operative spirit.

This spirit is very finely expressed in the existence of the American Society of Cinematographers. I have known of many clubs of artists and professional people, but never of one like the A. S. C., which exists not alone for social or economic benefits, but to practice concretely this ideal of professional cooperation. Practically all of the cameramen with whom I have worked have been members of this wonderful organization, and from them I have learned

I Meet the Cameraman

by

Tallulah Bankhead

enough about the society and its achievements to give me an unbounded admiration for the men whose idealism and ability have conceived and maintained such an organization.

Entering the motion picture business as I have, fairly recently, and coming into it from the stage, one has in many respects a helpful perspective with which to view many of the things which film people are prone to take for granted. Among these are the cameramen. Those of my friends who were already in the film had told me that the cameramen were, individually and collectively, splendid fellows and incredibly fine artists, and that a sympathetic cameraman was as essential to the success of a star as is a good story—but I found that they told me only a small part of the tale. No words can describe the artistry, the patience or the importance of the cinematographer. I am told that it is traditional for laymen to be disappointed upon seeing or meeting their favorite film stars in the flesh. I don't doubt it! No matter how perfect or how beautiful a star may actually be, the magic of the camera can add to that perfection to an unbelievable extent. Those of us who are not naturally perfect beauties—and our name is legion!—owe everything to the men who photograph us so skillfully. In my own case, I cannot say enough in praise of the men who have dealt so kindly with me in photographing my pictures. I have not, unfortunately, been in the business long enough to have had the good fortune to know and work with all of the cinematographers, but the four men with whom I have worked, Larry Williams, George Folsey, Charles Ling, and Oliver Marsh, have proven themselves not only superlative artists, but very fine gentlemen as well. I am proud to have known and worked with them—and I congratulate the camera profession on having such men. Each of them has done marvelous things in the course of their work on my pictures, and each has revealed himself as the most patient of teachers in helping me to accustom myself to this new medium.

There is really a tremendous difference between acting on the stage and acting for the screen. On the stage, of course, your technique is basically different because you are playing all of your scenes, in picture parlance, in long-shots. Even though you may be able to hold your audience in the hollow of your hand, it is always held at arm's length. It is never suddenly brought close up to you, with its attention riveted upon your face alone. You have in your favor the tremendous asset of color, and the intangible advantage which your actual presence gives. In the films, of course, it is just the reverse. To offset this, you must depend upon the cameraman. It is he who must photograph you so as to bring the warmth of your personality to the audiences throughout the world. If he fails in this—if you are a subject entirely unsuited to photography—the world holds you responsible, yet if he succeeds—if by his artistry he manages to make the shadow of your lovely self a warm and vibrant personality—it is your success, not his.

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Meet Tallulah Bankhead, who tells you her opinion of the Cameraman in this article.



TREND

of the TIMES

- ONE of the best news surfers' back east—not the keynote title—tells us of a title concern that was

on the treacherous rocks of bad business, in fact business was terrible, or to use a more graphic expression, it was rotten.

They proved to be true to the promoter type when one of their number conceived the brilliant idea of using the daily papers to advertise a movie cost of 25 feet for \$25.00. And did the embryo Crawfords and Dietrichs and Shearers come. The front of their place looked like a \$5.00 Hollywood premiere with the amorous movie struck girls dressed in their best bib and tucker and a twenty-five dollar wad in their sock awaiting their turn for fame and fortune.

If this movement gains any impetus across the country the proponents of the silver standard need no longer worry.

- THERE seems to be an unannounced contest in vogue among the studio writers to find a trick motion picture shot that the Camera department cannot execute. Only a few months ago the story brains of the industry did not know that such a thing as a "trick" shot existed. Then, of course, as they say in the fairy stories, one day a camera man showed a subway train on the screen, with the leading players boarding it and the crowds jostling on the platform. All of it worked out in the Trick Department. Now plot is becoming incidental. The Trick is the Thing.

- LET'S ventilate the ventilat on question. "Boy! open the doors and windows while we lay-hold of this problem!"

Now, just what good is ventilation? Why un-pragmatically breathe laden air? Why make the stages of the motion picture studios more comfortable and pleasant on which to work?

Of course, ventilation is recognized by even the lowly farmer for his cattle. His cow barn, his chicken roost and even the humble pig-sty has its ventilation system, but the motion picture stage in some of the major studios are fine places to induce sleep. Of course, maybe a person working from 8 to 13 hours a day does not need fresh air, possibly a fagged body is the thing for which they are paying the high salaries. That this lack of ventilation shows in the quality of some of the pictures does not matter. But, of course, maybe that is what some of the producers want. Well, they're getting it.

Watch the yawns as the day progresses.

- WHILE all of the other motion picture publications rant against George M. Cohan for his bitter utterances after returning to Broadway, we wish to extend to him our thanks for those nice things he said about the cameramen and the technical crew—other than that deponent sayeth not.

- LET'S toss the question of politics about a bit. It's always a juicy morsel. Here's the true tale on which you can tack your own moral.

The special supervisor of a picture didn't like the director, no or, he didn't like him a little bit. He didn't even like his shadow, and the brotherly love was returned by the director. Seemingly the supervisor covered his margin in the market with all of the close-ups made by the director, in any event the close-ups were lost, so the picture was no

good. "We need a new director" said the supervisor in his best supervising voice. So the entire picture was junked and the new director comes on the job and rewrites the entire picture with forty additional scenes, more or less, on advice of her observer.

Perhaps the moral of this to the director is "never make a close up."

- NOW some professor in France is going to start pre-historic cycle in pictures. In fact he is going pre-pre-historic. He is going so far back that he'll be the only man in the world because in the period into which he intends to research there were no men, just a bunch of those long necked lizards with the names like a complicated diacritic.

Professor, stop searching! Bring your troubles over here to one of our Trick departments.

- The bootlegger keeps his business a secret, the other's adverse.

- THERE seems to be that certain elusive something in motion pictures that makes the professional and the amateur akin when the question of production is in consideration.

The much heralded extravaganzas of the director, star and producer are seemingly finding their counterpart with the amateur. It is an everyday occurrence, now that the Amateur Movie Contest in The American Cinematographer is nearing its close, to receive lengthy wires, long distance calls and even cablegrams from across the big drink asking for last minute information. Much like the director who finds after he has gone on a distant location that he has forgotten the script or perhaps even, the leading lady.

- FROM the Vaterland a leak in the police department has informed the world that the "Haines" of Berlin are turning to the motion picture camera to help detect crime. Now, let's not get a wiring vision of this innovation and picture a second Hollywood with motor cycle sirens blowing followed by a limousine with the director elegantly leaning back in the upholstery of a special built Benz, followed by another with the blonde blondin, and still another carrying the prospective gunman who has tipped the police that he is going to rob the Reich bank, and they should be on hand with their motion picture equipment. So he can give them the laydown on just how a first class yegg works.

The "Polizei" work something like this. A crime has been committed, the burglar entered in a certain way, now there, Sherlock Holmes' intuition comes into play and they react the scene as they believe the burglar would have committed it, and, and, there you have it, the crime just as it was committed for the rookies to study. Directors take notice! Here's a new library source.



The new Cellulose Process Screen, developed for the RKO Studio by Sidney Saunders, standing at right



THE transparency projection process has within the past few years gained universal recognition as one of the most outstandingly adaptable special photographic or "trick" processes ever devised. Since it is, therefore, in every-day use in practically every studio, any detailed discussion of the process itself at this time would be merely an unnecessary repetition of what is already well known; however, in order to avoid any misconception, it may be well to recall that this process involves the use of a large, sand-blasted glass screen, upon which is projected the desired moving background, which is rephotographed, together with the foreground action, by a standard camera operating in synchronization with the projector.

There have been, however, definite physical limitations to this process. In the first place, it is extremely difficult to procure satisfactory glass screens of large size, this, of course, definitely limits the utility of the process, as well as adding to the expense. It has heretofore appeared to be practically impossible to eliminate a very noticeable "hot spot" or area of increased illumination at the center of the screen, all manner of expedients have been tried, including different types of surfacing, double and single-sided screens, and the like, but with little practical success. Lastly, the bulk and fragility of the glass screen—especially the larger ones—have raised many serious problems, most important have been the matters of danger and replacement, for a number of serious injuries have been occasioned by inadvertent breakage of these huge glasses, and, quite aside from the element of danger, the glasses are so fragile as to be non-insurable, while, under existing conditions, replacements are almost unobtainable.

The appearance, therefore, of a non-breakable, inexpensive, non-vitreous screen for this work is a development of an importance second only to the invention of the projection process itself.

Such a screen has recently been developed and is now in actual use at the R-K-O Studio in Hollywood. It was perfected by Sidney Saunders, an engineer in the Studio's Mechanical Department. A number of the new screens are being installed in the special-effects departments of other studios.

The new screen is of a cellulose composition somewhat akin to the familiar "Cellophane" used in the wrapping of many commercial products. In appearance, the Saunders Screen resembles a large sheet of waterproofed canvas, in use, it is stretched in a frame much as a sheet of canvas would be. It is flexible, non-breakable, inexpensive, and—unlike many cellulose products—particularly non-inflammable; it is actually impervious to anything but an open flame. Any heat sufficient to cause it to ignite would be more than sufficient to trip the regular automatic sprinkler system on the stage. These screens can be made in practically any size; the one in use at the R-K-O Studio is

Saunders Cellulose Screen Reduces "Hot Spot"

by
Vernon Walker, A. S. C.*

Head of RKO Special
Effects Department

seen by twenty feet—more than two feet larger in each dimension than the largest glass installation. A still more recent installation measures 17x23 feet. It appears the only limitations as to size are those imposed by stage space and the power of the projectors available.

Most important of all, however, are the definite advantages shown in the completed process shots made with this new screen. The objectionable "hot spot" is reduced by more than 50%, while the overall brilliancy of the projected picture is increased by better than 20%, and the projector-current can be proportionately reduced. This, translated into practical working terms, means that the cinematographer has a far greater freedom in both the lighting of his foreground action and the balancing of the projected-background with the foreground lighting. Moreover, the results obtainable with the new screen are far superior in fineness and gradation to the best obtainable with glass screens. The highlights, for instance, which are more or less grayed with sand-blasted glass screens, are a true white with the Saunders screen, while blacks, on the other hand, are more intense. The fidelity of the rendition of the tonal range between these extremes is likewise proportionately improved. The use of this new cellulose screen for process cinematography should, therefore, result not only in a considerable improvement in the quality of process shots and in the facility of their making, but also in marked economies in every phase of process work.



Medium special-effects work is frequently not noticeable as such. For instance, the ceiling on this set was painted in by the optical printer.

The Special-Effects Cinematographer

by

Fred W. Jackman, A. S. C.

Director of Scientific Research,
Warner Bros.-First National Studio

CONTRARY to the general impression, the studio special-effects cinematographer must be decidedly more than merely an engaging young person with a pleasant smile and a knack of doing strange things with a motion picture camera. Of course, he must be an expert in one or more of the many special photographic processes used for "trick" work, but in addition to being intimately familiar with all phases of photography, the trick-worker—especially the individual in charge of a large studio's trick department—must be a champion klutster. He must be thoroughly familiar with the technique and personnel of every other phase and department of production. No, it is not his task to show them how to do their own work—but only through intimate knowledge of the methods and aims of the other departments can the special-effects man make his department as useful to the other branches of production as it can be.

As a rule, the less technical departments of production—the writers, directors and cutters—not to mention, of course, the production executives—take one of two viewpoints in their relations with the trick department, either they ignore its possibilities completely, or they feel that nothing is too impossible for it to achieve. It is, therefore, up to the man in charge of the special-effects staff to wage a constant campaign of education as to the services

and possibilities of special-effects work. It should extend to every individual or department of production which could possibly benefit from the assistance of the special-effects department.

The writers, for instance, frequently hesitate to include in their scripts scenes or effects which, though easily possible through the aid of the special-effects department, would be either prohibitively expensive or dangerous if attempted in the normal manner. Since the advent of talking pictures, it is possible for writers to build up their stories through the use of dialogue in places or under conditions where recording would be impossible without the aid of the trick department. Certain optical effects, too, which are useful in telling a story can only be conceived if the ability of the special-effects department to execute them is known beforehand. It is therefore vitally important to familiarize the writing staff of a studio with the possibilities of special-effect processes, and to constantly remind them of these possibilities, so that they will simply proceed to turn out the best scripts possible, and leave the rest to the ingenuity of the special-effects staff. At least one major studio has adopted a policy of maintaining a special reel of process-shots from current productions, illustrating the possibilities of the various processes, and which is constantly available for exhibition to the studio's writers and directors. This is a fine policy, and one which should pay big returns in production efficiency.

The next link, of course, is the director. Or, to be more accurate, the directors, for a special-effects department is as a rule constantly working on scenes from half a dozen

or more productions. It is imperative that the process staff thoroughly understand the different ways in which each of these directors works, for this will in many cases determine the treatment to be given the process shots for a production. Some directors, for instance, go in for highly pictorial effects, others, for modernistic effects of angles, montage, etc., while still others depend entirely upon the swift pace of their action, and prefer extremely simple, commercial photography. Each of these will naturally make entirely different demands for process scenes.

The cinematographers, too, are predominantly individuals, the artistic style and technique of no two men is ever exactly the same. The process worker must take this into consideration in planning his work, in order that the process scene may be a perfect photographic match for the rest of the picture. Unless a process scene matches the rest of the picture perfectly, carrying the same type of lighting, diffusion and general photographic quality, it is sure to stand out as a process shot in the minds of the rapidly growing multitude of amateur cinematographers, who study each picture as they would a textbook. To the untrained layman, it will stand out as an intangible imitation, though he may not know what it is that bothers him. The special-effects staff must work in especially close coordination with the production cameramen, for different types of treatment in the regular production shots may require entirely different types of treatment for the process scenes—in some cases, even the use of different processes to gain the same effects under different conditions.

The production of the process shots themselves is more or less a matter of routine. It has been discussed in these pages so frequently that further repetition at this time is unnecessary. There is, however, one phase of the problem which has seldom, if ever, been mentioned in print: this is the matter of costs and estimates. Under the existing conditions in the motion picture industry, rigorous economies in all production expenses are mandatory. Miniature and process scenes are used primarily to save money in production costs, and to add production value without proportionate increases in cost, but this work can very easily absorb an entirely disproportionate amount of money unless the greatest care is exercised. I have known of instances where a miniature actually proved more costly than a full-sized set would have been. It is entirely wrong to believe that simply because a miniature is small it is cheap. Quite the reverse! The building of miniatures requires the employment of highly skilled designers and workmen, and unless the work is properly supervised, the costs of a miniature can be run up to very sizeable figures.

The greatest of care must naturally be used in planning miniatures. Their design and construction demands years of specialized experience, for a motion picture miniature is something basically different from either a toy or a conventional display model. It is a true scale model—but with all irrelevant detail suppressed. Suppose, for instance, we are to build a miniature ship. We would not build it as we would a regular display model, which is to be placed in a show window for everyone to admire. If you visualize a ship at sea, far enough away so that the width of your field of vision is twice the length of the boat, you will get only the essentials; if the ship is a steamer, you would notice the number of funnels and differentiate as to whether the craft were a warship, a liner, a yacht or a tramp. If it were a sailing ship, you would be conscious of the number of masts and, roughly, of the rig—but you would not be conscious of every detail, every rope and pulley, every stay and stanchion. If you build a reduced-scale reproduction of what you have just visualized you would not have any sort of a display model, but you would have an excellent motion picture miniature.

It is the same with architectural miniatures. Irrelevant detail must be suppressed. A miniature which, to the eye seems a perfect reproduction of a building or group of buildings, would be very likely to show up on the screen as a

most obvious miniature. Let us suppose, for instance, that we are to build a miniature of New York's Broadway. If we build it with photographic accuracy and detail, no power on earth can make it look like anything but a miniature on the screen. If, however, we build only the salient details—the contour of the buildings, the course of the street-car tracks, a few dim shapes of automobiles, trams, etc., leaving the rest to the imagination, we would have a satisfactory miniature. Since we have left out a great deal of the detail, such a miniature would be far cheaper to build, as well as more satisfactory than a detailed model.

The most satisfactory method of building these architectural miniatures is to use relatively crude plaster casts, with only the most meagre detail. If you build them out of wood, you find that it is practically impossible to eliminate the sharp lines on corners, etc., so that regardless of lighting, diffusion, or anything else that

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Right—Some early
tricks supplied
by the Trick
Department
Below—Mc-
Jackson





Moundil Path • by H. M. Armstrong

Sunset
High Sierras
From Desert
by
J. C. Macaff



"The
Melancholy
Days
Have Come"
by
Hilda Bazan





RIDDLE

ME THIS

THE RIDDLE

Do you prefer to make your exteriors with the interiors.

on the studio stage, or to make your interiors, with the exteriors, on location?

HAL MOHR, A.S.C. I've done both. In fact, on my last picture, *"The First Year,"* I used the former method, while on my current one, *"Tess of the Storm Country,"* I'm using the latter. Unqualifiedly, I prefer making the interiors on location. It's harder, but the results are better.

For *"The First Year,"* we built a truly remarkable middle-western village on two of the stages at the Fox Western Avenue Studio. Inasmuch as most of the exterior action was in the form of night-effect shots, the plan worked out rather well—and was, of course, a great convenience in preventing actual night work. But you cannot reproduce natural lighting by any of the methods so far known, if you make an exterior scene by artificial light; it will show up on the screen for exactly what it is. You can't disguise it any more than you can disguise a lithograph to look like an oil painting.

If, on the other hand, you build your interiors as practical parts of your exterior sets, you usually will secure something you couldn't accomplish in any other way. Of course, the difference in the intensity of the natural light outside and the artificial light inside raises some difficult photographic problems—but these can be overcome. For *"Tess of the Storm Country,"* we have built all of our interiors as practical parts of the exterior settings. So far, the results have proved more than satisfactory.

The method—particularly in the case of such small sets as we have been using—involved more work, but the results are worth every bit of it. I feel confident that if we can keep up the pace we have set so far, *"Tess"* will be the finest work of my career.

You see, working in this way, we are forced to do what we should always do—but usually don't do. We must con-

sider every shot—every camera-set-up—as an entirely distinct and separate entity. Not only do we have to move the camera, but we literally have to re-light the set for every shot. Not re-light it in the prefatory manner we usually re-light an ordinary set, but literally move every light on the set. Working in such cramped quarters, every light must be in its right place, there can be no superfluous units. In the same way, every camera position must be carefully thought out ahead of time. There can be no unnecessary footage—no unnecessary set-ups—and no unnecessary movement.

But these restrictions give us many unlooked-for effects. So far, I have made more than 85% of the picture with a 25mm lens. The quality and perspective that this gives has surprised me. For instance, in one shot I made the other day, I achieved the effect of a "zoom" by a simple pan in which I swung from a closeup of Miss Gaynor to a long-shot of the cabin with a simple free-head pan.

Of course, these unusual conditions make us all work harder, and take more time, for we are constantly re-lighting and, in many cases, actually re-building the set from one shot to another. But the results justify the trouble for by forcing us to depart from the conventional, this method gives us the unusual in lighting, in composition and in photographic and story treatment.

OLIVER MARSH, A.S.C. When I started to make *"Rain,"* which, as you know, was made entirely on location at Catalina, I felt the idea was all wrong. I wanted to handle the picture in the conventional manner, making the exteriors only on location, and coming back to the studio for the interiors. But as we got into production, I found I had been mistaken. I really secured better results than I could have in the conventional way—more truly in sympathy with the motivation of the story. In addition, *"Rain"* was an easy picture to work on because every shot had been definitely planned in advance, the sets had been designed with the camera and its problems in mind, and everything fitted together perfectly. If I had to do this picture over again, I'd choose the same treatment.

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Interior taken
on location



Exterior taken
in the studio



More Silence, Please!

by

John C. Gilmour

Head of Visual Instruction Section
General Electric Company

SILENCE is golden. No where does this statement hold more truth than in a modern sound motion picture studio. To the uninitiated, this sentence may seem contradictory, but it is, nevertheless, a fact. Every bit of equipment used upon a set must be able to operate noiselessly while a scene is being taken. Technicians, too, must be quiet while maneuvering this apparatus else the microphone would pick up extraneous noises made by them and their instruments.

In view of this fact, studio paraphernalia today has been materially altered since the "silent" picture era. The spluttering, hissing arc lamp, used to illuminate sets, has given way to the quiet, convenient, high-wattage Mazda lamp. Electric motors now drive cameras synchronously with sound recording machines. These cameras, once clattering, ticking, sound emanating devices, have been improved to operate more quietly. Since absolute silence has not yet been obtained, individual housings of sound proof material called "blimps" enclose each camera when a sound sequence is being shot.

"Blimps" differ in construction and there is room for more improvement, but satisfactory results have been obtained by the Visual Instruction Section of the General Electric Company in its sound studio at Schenectady with a housing of its own design and construction. This "baby booth" consists essentially of two units, a base and a cover or hood.

The base is of $\frac{1}{8}$ inch sheet aluminum and measures approximately 19 inches by 33 inches. The edges of this sheet were bent at right angles so as to form a tray about 2 inches deep. Holes of 2-inch diameter were drilled in the tray to remove "drumminess." To assure rigidity, 2, $\frac{1}{4}$ inch aluminum angles of $\frac{1}{2}$ inch size were screwed longitudinally to the underside of the tray. To the underside was also affixed a block of steel machined in the form of a wedge so as to fit snugly into the Bell & Howell tripod

plate on our Mitchell Tripod. The outer surface of the tray was then covered with 2 layers of $\frac{1}{2}$ inch felt. For the sake of appearance only, this surface was covered with a thin layer of finely woven black felt.

A piece of $\frac{1}{2}$ inch felt was then cut to fit snugly into the tray. A second piece, $\frac{1}{2}$ inch less wide and long was laid upon this. Two pieces of $\frac{1}{2}$ inch sponge rubber equal in width to the second piece of felt were then cut out. The rubber was cut so as to allow a space between the two pieces when placed in the tray. Another $\frac{1}{2}$ inch sheet of aluminum was cut equal in dimension to the layer of felt and drilled as the tray to remove "drumminess." Aluminum angles were also screwed to this piece for rigidity and between them in the middle of the bed were screwed two steel stanchions to support a new slide for the Bell & Howell camera. The upper surface of this bed was covered with a layer of $\frac{1}{2}$ inch sponge rubber.

When these layers were properly aligned in the tray, a bolt hole was drilled in each of the four corners and a long, washered, and rubber-hose encased bolt was inserted and a nut screwed on the bottom side of the tray so that the bed which really floats could not slide out of position during any camera maneuvers.

Although R. C. A. markets a gear reduction motor which fits a Bell and Howell camera with no other support than its mount for synchronously driving the camera, our camera is driven by a 220-V, 60-cycle, 3-phase, 1/10 horse-power G-E motor of standard design with an added 5 to 4 reduction gearing of our own manufacture. Since this motor is too heavy to support its own weight it was necessary to make a special sliding table to support the motor in proper alignment with the stop-motion shaft. This latter unit was composed of a piece of $\frac{1}{4}$ inch aluminum $7\frac{1}{2}$ inches square held by four space washered screws to the tray. A second piece of $\frac{1}{4}$ inch aluminum $8\frac{1}{2}$ inches by 6 inches to which the motor is securely fastened is held by four guide screws in slots and by a locking screw to the fixed plate. This construction permits the motor to be drawn back from the camera so that the latter may be slid over on the rack for aligning the slot. The leads for this motor as well as for the "marking lamp" are brought in through the base of the tray and bed.

The camera is a "Silenced" Bell & Howell. The interior and exterior surfaces have been covered with a layer of $\frac{1}{8}$ inch sponge rubber and the disengaging gears have been removed. When in use, the motor is pulled back and the scene to be photographed is lined up as with an ordinary Bell & Howell on an open tripod. When the slot is aligned, the camera is pulled into shooting position, the motor is pushed into engagement and locked left, the turret is thrown over, and the viewing finder is matched. The marker lamp is also checked.

Upon the tray and over the camera and motor, the second unit which is entirely independent is placed. This "bun-

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THRU the LENS of the CRITIC

"FAITHLESS"

photographed by **Oliver Marsh, A. S. C.**

IN THIS production, Oliver Marsh, A. S. C., has turned out one of the finest examples of cinematography that I have seen in a long time. His treatment throughout is intensely pictorial, and in every scene the pictorial is always properly subordinated to the dramatic requirements of the action. The production covers a wide range of settings, from Park Avenue palaces to squalid tenements, while the action embraces as many different moods. Marsh's photographic treatment invariably makes the most of every setting, and is perfectly keyed to the mood of the dramatic action. In addition, Marsh reveals a new Tallulah Bankhead in this production—a person uninhibited by camera-consciousness, and in no way resembling the indifferently photogenic star of the previous Bankhead films. For the first time, Miss Bankhead is able to appear on the screen as attractively and as forcefully as she did on the stage. Marsh is to be complimented upon this achievement—and Miss Bankhead is to be congratulated.

"WILD GIRL"

photographed by **Narbert Bredine.**

HERE is another example of beautiful photography, though of an entirely different genre. "Wild Girl" is the revised "box-office" title of that famous tale, "Salome Jane." Practically the entire production was made in Sequoia National Park, against the highly pictorial background of the "big trees." This location, of course, introduced some considerable photographic problems, but Bredine's skill at once made light of these, and reaped the utmost in pictorial value from every shot. In neither the day shots nor the many night-effects sequences is there any hint of over-correction, nor is there in any scene any suggestion of artificiality. It is a welcome thing, indeed, to see a film like this, which has been photographed by a man whose work during the past four years has confined him almost exclusively to the studio stages, and find such a complete mastery of exterior cinematography. There is likewise a very pleasant variation from the conventional method of lap-dissolving from sequence to sequence, from the opening title to the end, the film is treated like a book or album, as each scene is over, the page is turned to the next, making a very novel and smooth transition. The Fox Optical Printing staff is to be congratulated upon the execution of these effects, as is the unnamed individual who conceived them. It might possibly be said that this device was used a trifle too frequently for perfect taste, but the idea is so refreshingly new that its abuse can be forgiven—provided it is not repeated in other productions.

The only genuine criticism that can be levelled against this film is the neglect of the possibilities of tinted-base positive stock. The entire picture is printed on "Candle-flame" tint, since they were willing to go to this length, why could they not complete the job, and use a tint which

—like "Pradblow" or "Verdant"—would be warmer, and better suited to the Big Tree country location? The night scenes would have benefited enormously had they been printed on "Aure" or "Nocturne" stock. As it was, with the picture as a whole photographed in a relatively low key, it was difficult to differentiate between the night and day sequences. Moreover, most of the night sequences were sufficiently long so that the laboratory problems presented by the use of tinted stock would have been minimized.

"THE MOST DANGEROUS GAME."

photographed by **Henry Gerrard.**

HERE is a real cameraman's picture, for it was directed, supervised and photographed by cameramen. Menan Cooper—of "Crisa" and "Chang" fame—supervised, while his erstwhile partner in crime, Ernest B. Schoedack directed. Henry Gerrard found this as his first assignment after a long stay in England, and if his work on English productions was as beautiful as this, I don't see how John Bull ever let him leave the country. Although a horror-drama of the horrors, "The Most Dangerous Game" is one of the most highly pictorial films of many months. Every scene is first of all pictorial—though that does not mean that the directors forgot to include the properly thrilling dramatic action. But, first and last, this film is pictorial, and rendered doubly effective by a generous use of glass and matte shots, for which Verne Walker, A. S. C., and Lloyd Knechtel were responsible.

"CHANDU, THE MAGICIAN."

photographed by **James Weeg Howe.**

THE real magician in this case is not the mythical "Chandu," but a very real Chinese gentleman, James Howe. James—aided and abetted by the Fox Special-effects Department—has put more real magic into this picture than a carload of "Chandus" could dream of. In between his playful tricks of turning rifles into snakes, throwing "doppelgangers" around the Orient and making "Death Rays" function, Howe has done some very beautiful and legitimate pictorial cinematography. Bill Menzies—not so long ago the acknowledged dean of Art Directors—co-directed this piece, if he maintains the pace that he has set in this and in "The Spider," he may yet make atonement for the loss that the industry suffered when he deserted his drawing-board.

"FREE, WHITE AND TWENTY-ONE"

photographed by **J. Roy Hunt.**

HERE again a director has run amuck with a camera. In some directors, this might have been overlooked, but Dudley Murphy has on several other occasions shown that he really knows how a camera should be used, so his fall from grace in this production is inexcusable. "Free, White and Twenty-one" (see "Sport Page") sets a new all-time record for purposeless perambulation. Roy Hunt

Continued on Page 46



Herbert Brenson



Henry Glend

THE THREE men pictured on this page were selected by our reviewers for their outstanding photography in the productions reviewed in this issue. Their work was not only excellent, but exceptional in many of its phases. They deserve that special attention be drawn to their efforts in the respective pictures which they photographed. Their achievements should not be taken as a matter of course, therefore American Cinematographer elects them the "Month's Three Best Cinematographers."



Oliver Marsh

THE MONTH'S THREE BEST



IN THE

with

Emery Huse, A. S. C.

LABORATORY

plies of densitometry and their practical application. This particular installment has to do with

DENSITOMETRY

ALTHOUGH in one of the previous articles in this series the term "Density" as applied to photographic densitometry was briefly defined, it would be well at this point to enter into a more detailed explanation of the meaning of the terms "Opacity" (O), "Transparency" (T) and "Density" (D). These terms are used very frequently in densitometric discussions and refer particularly to the laws governing the absorption of light by developed silver deposits.

The term "opacity" applies to the resistance of a substance to the passage of light. Let us assume that we have a light of a certain intensity falling upon an object at some finite distance. If a semi-transparent substance is introduced between the light source and the object a certain amount of that light will be held back from the object. In other words, the interposed medium absorbs a quantity of the light incident upon it. Mathematically, this may be

expressed as $\frac{I}{I_0}$ where I is the incident light and I_0 the transmitted light. Opacity, therefore, is the light stopping power of the interposed medium.

The reverse of opacity is "transparency," this being the measure of the fraction of the incident light which passes

through the medium, or $\frac{I_0}{I}$

It was Hurter and Driffield who first introduced the term "density" to photographic terminology and it was based upon a definitely accepted law of absorption. They termed the amount of light stopping power of the interposed medium as density and defined it as the logarithm of the opacity or the logarithm of the reciprocal of the transparency.

A simplified expression of the definition of density is $D = \log O = \log \frac{I_0}{I}$

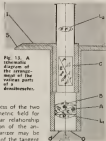
The physical instruments by which density of silver deposits are measured are of several types. Hurter and Driffield's original instrument was of the bench photometer type involving the use of the inverse square law for the computation of illumination values. Since that time many types of physical densitometers have been made but inasmuch as the purpose of this series of articles is to give a little greater insight into the subject of densitometry as applied specifically to the motion picture industry, we shall not spend any time in a purely historical resume because there are two definite types of physical densitometers available and actually in use in motion picture production which should be discussed in some detail.

One of the types of densitometers which is in use at the present time is known as the Martens polarization photometer, of which the Baugh and Lomb photometer is an adaptation. The Martens instrument depends upon an op-

tical system consisting of a polarizing device used for the production of a beam of plane polarized light and another device called the analyzer of the same or similar type, which may be placed in alignment with the polarizer and by rotation of the analyzer the intensity of the light transmitted by the combination may be controlled. The intensity of the light transmitted by such a combination of polarizer and analyzer depends upon the angle between the polarization plane of the two elements and this intensity may be computed precisely by well-known laws of optics.

Figure 13 shows a schematic diagram of the arrangement of the various parts. Two beams of light enter the instrument through two circular apertures, O and O' , each approximately 6 mm. in diameter. Both of these beams are polarized by means of the Wollaston prism, A , which splits the light into two components, one of which is polarized in a plane perpendicular to that of the plane of polarization of the other. On the upper face of the Wollaston prism is cemented a Fresnel biprism which forms the photometric field. The analyzing prism, C , is of the Nicol type. The lens, L , cemented to the lower face of the Wollaston prism is a field lens, while L' is the eyepiece lens. The analyzing prism, C , is supported so that it may be rotated about the optical axis of the instrument, its orientation being indicated by the index, I , reading on a scale S , which remains in a fixed position relative to the Wollaston prism, A . The photometric field as seen by the eye placed at the exit pupil of the eyepiece is circular in shape divided along a diameter by an image of the apex of the biprism, B . The field thus consists of two juxtaposed semi-circular areas, the relative brightness of the two being controlled by a rotation of the analyzer, C . One-half of this photometric field is illuminated by light which enters the aperture O while the other is illuminated by light which enters the aperture O' . If the intensities of the two beams entering the instrument are equal, the two halves of the photometric field will be of identical brightness when the index, I , reads at 45 degrees on the scale, S , or at a similar position in each of the other three quadrants of the graduated scale S . If an absorbing material is placed over one of the apertures (either O or O'), the two parts of the field will no longer be of equal brightness, but by rotating the analyzer, C , the equality of brightness can be restored.

The relative brightness of the two parts of the photometric field for any specified angular relationship between the position of the analyzer and the polarizer may be computed by means of the tangent



Continued on Page 33

REASONS

WHY CONSOLIDATED SHOULD BE MAKING
YOUR
RELEASE PRINTS

Our New York and
Hollywood plants
are especially
equipped to develop
negatives — to render a **COMPLETE**
Kodak laboratory service

1. QUALITY PRODUCTION

In the production of "Certified Prints", only the best Raw Stock and Chemicals are used. Only the most modern equipment and skilled operators with years of experience are employed. Nothing is left to chance. Every process is measured. This combination produces **RELEASE PRINTS** of uniformly high-grade quality — brilliant and clear — faithful reproductions of your negatives.

2. PROMPT SERVICE

Operation understood that our Service requires speed in production — overnight service when required. Our plants are capable of operating 24 hours a day. A complete organization is on duty at all times to meet the instant demands characteristic of our industry. Our capacity is over 1,000,000 feet per year.

3. SAFETY

Every scientific device known to our industry and endorsed by the leading government and insurance authorities is employed, together with carefully trained guards to guard your negatives and to keep them against any hazard. There is no possibility that the originality of your ideas and the contents of your production will be revealed to the industry or public until released for exhibition.

4. RESEARCH FACILITIES

A fully experimental laboratory is maintained. A selected scientific organization of chemical, technical and research engineers are constantly engaged in searching for methods which will improve and further standardize quality and prolong the life of release prints.

5. AMPLE RESOURCES

Working capital is ample to undertake any release printing contract — large enough to loan to our customers and to finance independent production on a large scale at moderate cost. Consolidated offers all the natural advantages of a large, specialized organization with more than twenty years of experience and service.



CONSOLIDATED FILM INDUSTRIES, INC.

NEW YORK

HOLLYWOOD



Figure 2

Split Film Recording

WASTE is difficult to control, particularly when a chaotic condition exists such as we had four years ago, when sound appeared in the motion picture business. The immediate problem was to complete a satisfactory product. Later, the apparatus supply became sufficient, and, even more important, studio and exhibition personnel, both executive and operating, grew more cognizant of the principles and practices involved. Limitations which had existed were removed, and the sound organizations were more nearly able to assume their full constructive position in the business. With improved mutual understanding, many steps have been made practicable, leading to the simplification and better coordination of the various processes in producing a picture. Even now, however, we are some distance from the ultimate, because, perhaps, of economic reasons and of the difficulty of rapidly making changes of a revolutionary nature.

One outstanding item in picture cost, though a relatively small one, is the cost of the raw film stock used for sound purposes. To use an inch width of film to accommodate a sound track less than an eighth of this width, and to continue to do this on lengths of many millions of feet, is manifestly a gross waste. Many methods have been discussed for using narrower film, but for various reasons no action was taken for a long time to put them into practice. The closest approach was the use in some studios of both sides of the film for certain types of sound track, where either track could be used, provided no cutting was necessary. Finally, toward the end of last year, an analysis of methods and equipment at the Metro-Goldwyn-Mayer Studios indicated a solution which has since been put into practice with complete success. This experience has resulted in similar analyses by other studios, and the adoption of split or narrow film methods in many organizations where a benefit was found to be derived.

Several somewhat diversified practices have thus been evolved to save sound film. For example, the film may be split at some stage in its progress, or, on the other hand, it may seem best never to split the film, but rather to concentrate on a saving in the use of original film, and to provide means of again using the other side in case the track on the first side is not acceptable for the picture. The choice rests upon the detailed procedure in each studio, and upon its adaptability to the proper modifications to get the most out of the system adopted. Thus, at Metro-Goldwyn-Mayer the film being split after development happens to work out best, but this may be quite untrue in another organization.

The Metro-Goldwyn-Mayer split film process is based upon the idea of using standard 35 mm. film up to and including the laboratory processing and then splitting it in half—to 17½ mm.—negative and positive alike. Re-

cording procedure is such that after a roll of film is run through with a record made on one side, the take-up magazine containing the exposed film is reversed and inverted, and becomes the feed magazine for a complete recording upon the other side of the film. This double track film goes to the laboratory, and is processed in the standard 35 mm. developing machine in the usual manner. After drying, the film is split in two, whereupon the individual takes are broken down for printing. The printing operation is similar in principle, that is, prints are made on both sides of a 35 mm. film, which is processed on standard machines, split after drying, and then becomes available for additional use in the 17½ mm. form.

A number of equipment changes are required to accommodate the new size film. Consideration of the details involved showed clearly that the least practicable arrangement would be that which entailed any modifications in developing machine equipment. This equipment had just been installed and its operation had reached a state of perfection which it seemed unwise to disturb by introducing a new set of requirements. In addition, estimates of the total cost and complication of making the necessary changes in other types of equipment were low, even including the limited amount of design and development expense required. Moreover there is the important factor of a strong aversion on the part of all concerned toward processing 17½ mm. film in production quantities, based upon cost and difficulty of handling.

An adapter is needed on the recorder, for the upper magazine, which fits the latter in either its regular position or reversed. One form of such a device is shown in Fig. 1. Two hinged pieces are mounted on the magazine opening in the recorder, such that with one in place and the other swung out, the opening is identical with the standard design. Reversal of the position of these hinged pieces produces a magazine opening which is the reverse of the standard arrangement, and permits the magazine to fit in place with the normal rear side to the front. The standard hold-back device is still applicable on the upper magazine, except for the removal of its original mounting on the recorder and provision for mounting it directly on the magazine itself.

It is desirable to install an anti-buckle device in the recorder and to include with this a means of stopping the machine when the end of the film runs out of the feed magazine. Both of these are important, the former because the machine may not be opened for any purpose until the complete roll of film is run out, and the latter to prevent having to carry the take-up magazine back to the loading room to retrieve the end of the film after the first run through the machine. Fig. 11 shows a method of meeting this requirement. If a buckle starts, it causes film to push against a long, light lever, which trips a contact. The film end release is a shoe riding on the center of the film, and arranged to drop into a recess in a roller when the film runs out, the movement of the shoe serving to trip the same contact. This contact controls a magnetically operated spiral spring clutch between the driving motor and the recorder, thus removing power when the contact opens and allowing the recorder to stop in about five inches of film.

Because of the use of both sides of the film, the record-

Reduces Production Costs

by

Wesley C. Miller

Chief Engineer, Sound Department
Metro-Goldwyn-Mayer Studio

ing lamp must be cut off while the machine stands still, to avoid fogging the whole length of film inside the box. A magnetically operated shutter accomplishes this, and also serves as a synchronizing mark on the sound track.

It is obviously impossible to open the recorder between takes to mark production data on the film. However, some time previous to the adoption of split film recording, the studio had put into effect a scheme of logging camera and sound takes, which had been working successfully. By means of this, slating time on sets is greatly reduced, and the records of the cameraman and recorder operator are used to identify the film until a title slate can be applied in the laboratory. Start marks are obtained through the use of a camera logging lamp operating in coordination with the sound track shutter. In a studio where such a system is not in operation, temporary hardship might be felt in imitating it, but its practicability has been proven by several months' experience with it. As matter of interest, camera and sound negative are never brought together at any stage of the entire process, all synchronizing and assembly being done by separate groups using the film logs as their instructions. In this respect, viable double edge numbers on the sound negative stock are an advantage.

Modifications are required in all reproducing apparatus, including dummies, master projectors, moviestars and preview dummies, in reels, numbering machines, footage counters and splices. In addition, a film splitting machine is necessary. In spite of the imposing array of apparatus involved, the changes in each piece are of a simple and inexpensive nature. Their details are fairly widely known by this time, and a description of them here is unnecessary, as they are mostly of a very obvious nature. It is sufficient to point out that they have been completely successful in operation.

Splitting sound negative film at present demands that the release negative be completely recorded. The first reaction to this is that a degradation of sound quality will result. Closer examination reveals that such is not the case. In the first place, fully one-half of all release work must be rerecorded because of the introduction of material in addition to the originally recorded sound. Second, the relative volume levels may be more easily and permanently controlled, as it becomes possible to adjust them to the complete satisfaction of the producer without having to trouble with quality variations due to light or dark prints. This is an important factor when the replacement parts and re-release problem is considered. Original release prints may be made in the home laboratory in close contact with the sound organization. Additional prints made elsewhere will usually be handled differently, and in spite of the best intentions, irregularities in volume level can easily result.

Recording technique has progressed considerably, and in its present state can, with care, produce remarkably good

copies of an original. Any slight quality variations which may be produced by rerecording have been found to be outbalanced by the improvement made possible through being able to finally touch up and adjust the released sound. Oddly enough, full rerecording of the release sound has also resulted in a net saving in the elapsed time between the completion of the additional work and the beginning of production printing. Even when, later on, release printing from half width, single sprocket hole, film is recognized as feasible, the present indications are that no change will be made in the practice of completely rerecording.

Some criticism has been made that sound quality would suffer from the use of a single set of sprocket holes. It is our present opinion that this is not the case. Flutter and frequency tests, as well as listening tests, indicate that the reverse is true. Namely, the sound reproduction averages better than with full width film operating with two sets of sprocket holes. The probable reason is that the half width film has but one set of shrinkage and perforation conditions to adjust itself to rather than having to alternately try to fit first one side and then the other of the various sprockets it passes over.

The theoretical saving, due to splitting film, is one-half. This value is impossible to achieve because of the short end problem, which is proportionately the same whether the film is split or not. Moreover, it is necessary, with this method of splitting, to run out a certain amount of film on the side opposite a previously exposed track, as the film may not be removed from the recorder without doing this, or the previously recorded side will be ruined. In one sense, this run out silent track is a loss, but broadly speaking, a large part of it is absorbed in the editorial and release processes as leader or silent track, which relieves for other purposes film which had previously been diverted for leader use. Such lengths of film may easily become waste, unless their use and handling are controlled. Here, again, the studio organization is obtaining practically full effective use of this material.

The actual saving in purchased film during the past six months since split film has been used throughout, has averaged about forty per cent., as compared with the theoretical fifty per cent. possible. This amount, while small compared with total picture cost, amounts to a distinct saving, particularly as it is obtained without any sacrifice of quality or ease of operation in the studio. It is already sufficient to cover the cost of all equipment changes with a comfortable margin to spare. Finally, the entire change was put into effect with the greatest of ease, and entirely without loss of time or production film. Its success in the Metro-Goldwyn-Mayer Studio has been established beyond doubt and it is contemplated that in some similar form it will be a permanent feature of production.



Figure 1

AMATEUR MOVIE MAKERS CONTEST CLOSES OCTOBER 31st

\$2000 in Prizes!

\$1,000 in Cash

\$1,000 in Equipment

First Prize \$500 cash

Third Prize \$150 cash

Second Prize \$250 cash

Fourth Prize \$100 cash

ALSO

BELL & HOWELL COMPANY will present to winners who have made their pictures with a Filmo

1st—A choice of a Filmo TODA camera listed at \$280.00 or a Filmo Model J L Projector listed at \$298.00

2nd—Choice of Standard Cooke Telephoto Lens values \$60.00 to \$95.00

EASTMAN KODAK CO. for first example of photography in any out-of-doors picture whether it wins cash prize or not and without consideration of story subject

A Model K Cine Kodak, with a f1.9 lens complete with carrying case, priced at \$150.00

MAX FACTOR MAKE-UP STUDIOS will present one of the famous Max Factor Make-Up Kits, completely equipped, to the winner of first prize

HOLLYWOOD FILM ENTERPRISES, INC. offers to the person or Amateur Club located in California, who enters the best 16 mm. or 9½ mm. picture from California, regardless of whether it wins cash prize or not

A Model B Cine Voice, Home Movie Talking

Picture Machine complete with carrying case, priced at \$129.00

May be attached to all projectors

HOME MOVIE SCENARIOS, INC. To winner of first prize, one scenario (choice), one HMS Matte-box, choice of any HMS filter and one HMS Scene Slate

To winner of second prize one HMS Matte-box and choice of any HMS filter.

If first prize picture is made from an HMS scenario they give an additional cash prize of \$100.00

If second prize picture is made from an HMS scenario they will give an additional cash prize of \$50.00

If third prize picture is made from an HMS scenario they give an additional cash prize of \$25.00

METEOR PHOTOLIGHT COMPANY will present the winner of Fourth cash prize the following equipment

A Meteor Double Photolight complete with 500 watt Neron bulbs, retail price \$30.00.

A Meteor Photolight Tripod complete with Neron bulbs, retail price, \$18.00.

Meteor Photolight Table model complete with bulb, retail price, \$18.50

ONLY A FEW DAYS LEFT TO ENTER! HERE ARE THE RULES . . . READ THEM

This contest is open ONLY to AMATEURS. No professional cinematographer will be eligible to compete.

The contest ends at midnight of October 31, 1932. All pictures must be entered by the closing date or they will not be considered. Entries mailed or expressed bearing the date of sending will be accepted if they reach THE AMERICAN CINEMATOGRAPHER office after October 31, 1932, providing the date shows they were sent before midnight of October 31, 1932.

Pictures submitted in this contest will be judged upon photography, composition, direction, acting, cutting and entertainment value. And only silent pictures will be eligible for the contest. The judges, whose names will be announced later, will include outstanding and widely known Cameramen, Directors, Actors, Writers and a group of nationally known Motion Picture critics from some of the best known newspapers in America.

The decision of the judges will be absolutely final, and there can be no appeal from their decision. Announcement of the awards will be made as soon after the close of the contest as possible and checks will be mailed the winners.

Pictures may be submitted either by individual amateur movie makers, or they may be submitted by Amateur Movie Clubs. However, they MUST BE photographed on 16 millimeter or 9½ mil-

limer film. Accompanying each entry must be a sworn statement to the effect that no professional cinematographer assisted in the making of the picture. No pictures will be accepted which were photographed on 35 millimeter film and then reduced to 16 millimeter.

This contest is open to amateurs and amateur clubs anywhere in the world, with the following conditions:

Only Bona Fide Subscribers to the American Cinematographer Can Compete

If you are a paid-up subscriber to THE AMERICAN CINEMATOGRAPHER you are eligible to enter the contest. If you are not a subscriber just send in your check for a year's subscription and you are eligible.

In the case of Amateur Clubs the following rules apply.

If a club with a membership of 20 or less wishes to enter a picture, the club will have to have a minimum of 5 subscribers among its members. Any club with more than 20 members will have to have a minimum of 10 subscribers among its members. For any further information you may desire, write the Editor of the American Cinematographer, 1222 Guaranty Building, Hollywood, Calif., or consult your photographic supply dealer.

IF YOU WISH TO ENTER THIS CONTEST AND ARE NOT A SUBSCRIBER, MAIL COUPON TODAY

AMERICAN CINEMATOGRAPHER, 1222 Guaranty Bldg., Hollywood, Calif.

Enclosed please find Check or Money Order, for \$3.00 (\$4.00 foreign) for which kindly enter my subscription to THE AMERICAN CINEMATOGRAPHER for one year.

Name _____

Address _____

It is understood that this subscription makes me eligible to enter your \$1000.00 Amateur Movie Contest.



WHEELS OF INDUSTRY

● The Galen Manufacturing Company has announced an automatic rewind for the amateur which automatically rewinds the film as it is projected.

It is their claim that it gives the film longer life, due to the fact it is not exposed to the dust for any appreciable length of time; less handling of the film, and it is stored in a fireproof humidor.

While it is their claim it can be used with practically all projectors, they do not list the projectors for which it is available.

● From London R. G. & J. Beck, Ltd., announce their new Focostat Cine Viewfinder, for which they make the following claims:

"This finder has been specially designed and computed to overcome the disadvantages usually found in similar devices for use with cinematograph cameras.

"In the Focostat viewfinder the image appears of the same order of brilliancy as the actual object. There is no ground glass or other dispersing medium in the focal plane, so that the image seen neither loses its brightness nor its critical definition.

"What is actually seen is a large, brilliant, erect image visible with both eyes from any reasonable distance behind the viewfinder.

"No focusing of the viewfinder is required: objects at all distances being simultaneously sharply defined. Due to the computation of the lenses and the original construction adopted, the definition given is of a very high order.

"The Focostat viewfinder is constructed for use with any lens from 1½-in. focus to 8-in. focus. The mask which limits the view observed can be varied in size by the rotation of a milled head. This head is marked for the various lenses and can instantly be set. The size of the mask can, of course, be set to any opening within its range, so that lenses of odd focus can be suited. There are no loose masks with their attendant disadvantages.

"An entirely new feature of this viewfinder is the provision of an indicator line, at the correct distance from the side of the mask, to show the amount of film occupied by the sound track. This indicator works automatically with the mask, so that its position relative to the mask is always correct. The field of view is bounded by a narrow border of green transparent material, so that when the mask is closed down objects just outside the picture can be seen.

"The finder can be made to suit any camera, and can be fitted on either side.

"An accurate camera tilting device is incorporated, by means of which the finder is adjusted to suit objects at different distances. The controlling drum can be scaled to suit any make of camera or blimp. A disc of white celluloid is attached to this drum to enable the operator to mark any special distances he may wish to record.

"A socket is provided for fixing on a small tripod to enable producers to obtain an accurate idea of the pictorial value of the set."

● A new printer has just been developed by André Debré of Paris to reduce 35mm. film to 8mm. Two 8mm. prints are obtained at the same time on the 16mm. film used in the printer. The film is split after developing. Debré announces a small developing machine 7 ft. long, 6 ft. high and 3 ft. wide. Also a perforating machine for 8mm. film.

● Cameras being made by the Eastman Kodak Company are being shipped across the ocean in both directions, according to a news dispatch from that company.

Their European Cameras are selling in the United States while the American Kodaks are selling in Europe.

The explanation is that America leads in the manufacture of high-quality, low-cost instruments when the demand is sufficient to permit large expenditures to be made for tools and special machinery. Europe leads in the production of cameras equal in merit when a specialized and smaller demand makes machine tooling impractical.

Consequently, the United States is in a successful competitive position in the European market for standardized cameras like the Kodak. Europe, on the other hand, has the advantage in the American market for a variety of specialized cameras appealing to advanced amateur photographers but not sold in large quantities.

● The new Bell & Howell scraper unit

which they have just perfected removes emulsion in splicing by very much the same method as the professional, according to their claims. They also state in their announcement that this dry scraper can be attached to any B & H 15mm hand splice outfit in view of the fact that this new scraper needs no moisture it is the contention of the manufacturer the work is done faster and is preferable in that it is set to the right cutting depth.



● The Bell & Howell Company has extended the guarantee of their Film Cameras and Projectors from two to three years. Their Ezymo 35mm Cameras are also covered by this new guarantee.

An additional new feature of the Bell & Howell guarantee is the provision for free annual cleaning and lubrication for the duration of the guarantee. Under the terms of this provision, the owner may have his camera and projector thoroughly gone over once a year for three years. It is expected that this free service will be commonly requested just previous to periods of intensive equipment use—for instance, on cameras, in the spring, ahead of the vacation season. This user can, without cost, assure themselves in advance of careful operation when such operation is most desired.

FROM REGULATED "INKIES"
TO MERCILESS DESERT SUNSHINE

EASTMAN Super-sensitive Panchromatic Negative with gray backing provides a medium that producer, camera-man, and laboratory alike can endorse without reservation. It is amazingly adapted to every type of illumination, from carefully controlled "inkies" to merciless desert sunlight. As an all-purpose film it exactly meets the demands of unusual economy in production as well as extraordinary quality in results. Eastman Kodak Company. (J. E. Brulatour, Inc., Distributors, New York, Chicago, Hollywood.)

EASTMAN **SUPER-SENSITIVE**
PANCHROMATIC NEGATIVE (GRAY-BACKED)



KEEPING UP with the AMATEUR

THAT the Amateur Cinematographer is displaying the same ingenuity in the solving of many of his simpler problems that made the amateur radio builder a known quantity in that field is becoming a bit more evident as these thousands of workers in the field of cinematography step a little more into the limelight.

Organized as many of them are into clubs, they have a producing power in their field that makes them almost equal to a completed unit in one of the largest studios. Mass activity, many have discovered, is bringing them pictures that would be utterly impossible for the average amateur to procure. Not only subjects that are wide in their scope, but a variation of viewpoints to complete the whole that is startling to many of them in the completed picture.

Big events are proving fine subjects for clubs to concentrate upon with their cameras. During the recent Olympic Games in Los Angeles, the Los Angeles Amateur Cine Club organized their membership with a view of obtaining a complete historical record of that event. Members were deployed in every section of the stadium so that every conceivable angle of the events could be placed on film. They sat in the bleachers, in the grand-stand, close to the starting point, at the finish line, up high so as to get long shots and angle shots, underneath for the diving events, close to the judges to get a shot of the winner. In fact amateur cameras were trained on every event in such numbers and from such strategic positions that the organization of this bit of producing would have done credit to a general of the industry.

Thousands of feet of film were shot, much of it, of course, cannot go into the finished production of the "100th Olympiad" but what remains will still be a fine record for each individual for a picture in his own library.

When all film was turned into the club headquarters a committee was appointed to cut and edit the 10,000 feet submitted to them by their members into a comprehensive subject that would be a faithful record of the event.

Just one phase of this alone demonstrates the wonderful value of this combined work, the 10,000 feet of film that was shot. No one man would have dreamed of exposing this footage on an event even as big as was the Olympiad in the world and history of sports, but here through the combined efforts of many, a club subject has been produced that will not only have interest through the years, but with the coming of the next and subsequent Olympiads will be of tremendous historical value.

Wayne Fisher is the president of the Los Angeles Amateur Cine Club and Perry Bacus secretary. Among those on the committee to edit the Olympiad subject in addition to the officers are: Fred Champion, Church Anderson, Tracy G. Hall, Frank B. Skeele, Dr. W. R. Madden and E. G. Chapman.

Another club production that demonstrates the value of mass activity is the plan being operated by the Portland Cine Club of Portland, Oregon.

Here we find a club determined to demonstrate a bit of civic pride in a picture which they have entitled "At the End of the Oregon Trail."

This picture was planned by the club late in spring so that many of their members who would be touring during the summer throughout the state would have something definite to shoot for the club picture. A complete and comprehensive scenario was outlined. Titles were written and a copy given to every member of the club, so that no matter in what part of the state of Oregon they might find themselves there would be something they could shoot for the club production.

The opening act titles of the picture will depict the pioneer in his early struggles to reach Oregon. Throughout the pictures the titles will be reminders of these early settlers, while the subject matter will be present day scenes throughout the state, opening with highway scenes along the Columbia River, then going into the fine waterfalls that abound in that state with shots of scenic beauty that hit you at every curve of the road. Agriculture and the big cities will come in for their share as will the shipping industry and airlines that lead into Portland. Lumber, one of the chief industries, as well as fishing, will be given a place in the picture. Also sports has not been overlooked.

While the picture has not been completed, it is expected by the officers of the Portland Cine Club that their finished production will be one of the finest records of their state and a picture for their club library that will be in great demand, and perhaps one that will settle many arguments as to which amateur found the best spot in which to vacation.

Photographing Through Reading Glass

OLD mother necessity teaches us many a trick. Arthur R. Powell of Azusa, California, decided to photograph the silkworm from the egg to its full growth. For some of us who are of a nervous temperament this may seem a tedious task to set for oneself, but Powell started it and determined to see it through to the bitter end.

He wanted a close-up. He couldn't shoot through the

Continued on Page 37



Egg of Silk Worm taken
from 15 mm.
film

Silk Worm photographed
through ordinary
reading glass



This Camera Cuts Movie Costs Nearly $\frac{2}{3}$...

*The Ciné-Kodak Eight
Makes Every Foot of
Film Go as Far as Four
... Costs Only \$29.50*

MOVIE MAKERS everywhere have hailed Ciné-Kodak Eight as the biggest news since home movies began.

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EASTMAN KODAK COMPANY, Rochester, New York

Film Sends Alcohol on By-Product Spree

by

Franklin Courtney Ellis

Sellman Kodak Company

WHEN the average person, in or out of the motion picture industry, thinks of film manufacture, he thinks of the finished product, cut-film, roll-film, X-ray film, and so on. Cinematographers may extend this list, because of their more or less intimate knowledge of the hundred different types of film that the photographic market demands; but beyond this, none out of ten accepts the layman's viewpoint, and feel that in so far as film manufacture is concerned, a film factory is rather like a sausage-mill in go the raw materials at one end, and out at the other end comes the film. But it is hardly so simple as all that. When a film manufacturing plant attains such magnitude that it produces several million feet of film each year, and film of perhaps a hundred different varieties, it faces the same economic problems that confront any other big business enterprise. It must be assured of an adequate supply of raw material, and it must guard against the waste of any possible by-product which may conceivably have some commercial value. In this respect, it is only following the example of the sausage-mill we have already referred to, for anyone who has visited a big packing-plant can testify that Messrs. Swift, Armour, et al. utilize every possible part of the pig except his squeal—and that, it is rumored, they now sell to the Radio people, for static!

Therefore, the film industry must think first of its raw materials, and then of its by-products. Film can be no better than its ingredients. Quality must be kept to high standards, but at the same time, the greatest economy must be observed in their procurement. Some of these raw materials are standard chemical products which, once a definite standard of purity, etc., has been estab-

lished, can most economically be obtained on the open market. Others, however, are best obtained by the manufacturer producing them himself. In some instances this involves the acquisition of some large industry, apparently unrelated to the manufacture of motion picture film.

One such case carries with it the story of an industry, large in its own right, which introduces some of film's "cousins." The raw material in question is wood alcohol.

Motion picture film contains no wood alcohol, yet very large aggregate quantities are used in film manufacture. No mystery lies behind that statement. Wood alcohol is used to dissolve nitrated cotton, but is then driven out of the film "dope" as heat drives the solution into sheet film. Chemically pure wood alcohol—just one material used in film making—was important enough in the manufacturing economy to cause the largest photographic manufacturer to set up extensive lumbering operations in the forests of four states, to build a railroad system, and to establish a plant for turning waste wood from the forest and from the sawmill into chemically pure wood alcohol and other useful products.

In the lumber business, only about 40 per cent of the average tree is utilized as lumber. Part of what is left is used in other ways. For instance, sawdust stokes the fires to run the machinery of the average sawmill. Much of the rest is waste—but what is waste for the lumber industry is raw material for wood alcohol and a number of other products. The lumberjack slashing limbs from a felled oak on a Tennessee mountainside may not even realize that the limbs he removes and loads on a mule-drawn sledge, play a part in the movie show he sees on Saturday night. So too do the rounded slabs sawn from logs in the company's sawmill in the process of squaring up lumber for the market.

Charcoal, the residue after distillation, is an unusual "cousin" of motion picture film, but, as a product of this photographic subsidiary, it is charcoal with a higher education. Even the dust raised in screening the various sizes of charcoal is collected by a vacuum system for brightening into drying air fuel that cooks the cameraman's meals when they travel to location. The chickens broiled for those meals may also have been fed powdered charcoal—a by-product of the film industry.

Dividing pyrolygneous acid into chemically pure wood alcohol and other "solvents" for film making and into wood pitch and cresote oils—by-products—is less remarkable than what happens to the third general derivative of pyrolygneous acid—acetic acid.

Acetic acid was comparatively unimportant in the whole scheme of the film industry when the plant for manufacturing wood alcohol was established. The alchemy with which a movie-conscious world has taken to general pictures, together with the greater use of x-rays since the War, has increased the importance of cellulose acetate, made from acetic acid in the film manufacturer's economy. Film for these two specific purposes is made from cellulose acetate. The so-called "safety film," rated by the National Board of Fire Underwriters as presenting somewhat less fire hazard than common newspaper paper of the same form and quality, can be used for amateur movies and in-situ work in homes, schools, and hospitals without the projection and storage precautions necessary with cellulose nitrate film. Lack of the needed equipment for adequate precautions would otherwise have greatly restricted two useful fields.

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Hunting "Movie" Gold in Alaska

by

V. A. Morgan

ALL of the pleasures of a life-time put together could never equal the pleasures I had last year in my first attempt as an amateur cinematographer, stalking the wild life of Alaska with a 16mm camera. For years I had done my hunting with a rifle, seeking especially the huge heads of the Dall Mountain Rams, but from the time I saw my first hunt films moving across the screen, I knew that I was destined to forsake the rifle for the photographic reel. When one is new to the sport of hunting, he derives his greatest pleasures of the chase from making his kill in a neat and sportsman-like manner; but as one grows older in the sport, his interest turns less and less toward the kill, and more and more toward enjoyment of the beauty of wild life. Then is the time that photographic hunting begins to weave its spell, for only in this manner may one preserve the scenic beauty and the glorious movement of the chase.

It is hard to go back into the past and take a duplicate print of anything from your brain—much less to reproduce each movement of an animal so gorgeous in every movement as is the wild ram. With a still camera, you can capture and reproduce the form, but not the movement. But with a cine camera you can reproduce the slightest motion—every glorious bound—at any time, anywhere.

I am therefore happy to be back in Alaska again, once more hunting—but this time with my trusty 16mm camera as well as my rifle. I have made this trip into the wilds especially to make my second film for THE AMERICAN CINEMATOGRAPHER'S Amateur Film Contest; my first entry—the result of last year's trip—is already in the A.S.C.'s vaults in Hollywood, and I am concentrating on my picture-making this time, hoping to produce a film which will at once be a true picture of Alaskan wild life, and impress the judges in the Contest. But whether I am able to win a prize or not, I know that the new pleasures that are every day revealing themselves to me as I pursue my queries with the camera will more than repay me for all of the trouble and hardship that such a trip as this necessitates.

And, believe me, hardship is the correct word for it! The wild life of Alaska—at least such of it as I am trying to photograph—does not haunt the regular tourist lines. Therefore, like Mohammed, I must go to it—and that necessitates traveling afoot into regions where horses can't go, scaling mountains and glaciers with a pack on my back, a small amount of food, a sleeping-bag, gun, cimeter, films and camping equipment. Such an experience gives me new respect for such handy professionals as Martin Johnson, Clyde de Vinna, Ernest Schoedack, Frank Buck, and the others who roam the far places to bring back professional films of wild life for our American audiences.

I have just returned from a trip amid glaciers that have

seldom, if ever, been visited by man—much less photographed. Tired from my heavy pack, I camped early the first day out beside a beautiful lake which I have always admired. Throwing my pack on a bed of dried spruce boughs which I had cut the year before, I was ready to turn in when I saw a bull and cow moose step into the knee-deep water and lily-pads a hundred yards away in the lake. I hastily unpacked my camera and a roll of film, and tried with nervous hands to thread the camera, but the moose saw me, and bolted for the sheltering timber before I could get the camera into action. My heart sank. Would they return? My only hope was to be quiet and wait.

In a few moments I heard a limb crack, close by. There they were again! They trotted back to the water, going in up to their stomachs before they stopped. Then they soured their heads deep under the surface, to drive the moose-flies away from their ears. They were within 60 yards of me! Would they stay long enough to let me get a picture—or would the sound of the camera drive them away?

Quickly I set the focus and diaphragm of my telephoto lens, and pressed the trigger. Would the purr of the camera frighten them away? No, they could hear it as they walked slowly toward where I was hidden behind a log, but they seemed not to mind it. I got a good, long scene, then ducked low behind my shelter to rewind. Up again—the moose were much closer by now. When the camera began to purr, they started nervously at the unaccustomed "click-click." Then with a toss of their heads, they turned and loped for the shelter of the timber—while my camera captured every detail of their long strides. My gauge told me I had taken 45 feet of film—surely a good beginning! I turned happily to making camp.

At 11:30 P. M. being unable to sleep, due to the incessant attentions of the mosquitoes, I saw my two moose reappear at the far end of the lake, a half-mile away. At 2 A. M. by my watch I glanced toward the mountainside high above me and saw eleven goat. I was happy, for I knew that I could get the pictures that I wanted. Bear in mind, please, that in Alaska one can see almost as far at midnight in the middle of June as he can see at mid-day, for the sun does not set until 10:30, and then there is only a mild twilight until dawn. At 2 A. M. the sun is once more shining brightly.

Leaving camp, I was thinking of the goat and the pictures I hoped to get, when suddenly a huge black bear appeared in the trail. My camera was in the pack on my

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Shopping for Seal Skin Coats in Alaska



EDITOR'S NOTE: Undoubtedly the most important development now taking place in either professional or amateur motion pictures is that of "sound on film." The best brains of the industry are being applied to the problem which is every day entering nearer to practical solution. As the matter stands now, the greatest question is that of setting definite dimensional standards for the new system; therefore, in this and several succeeding articles THE AMERICAN CRISTALLOLOGRAPHER is attempting to present in an impartial fashion the viewpoints of the adherents of the various proposed dimensions.

Motion Pictures

THE admittedly attractive features of motion pictures with sound on 16mm film have heretofore been obscured by some rather difficult technical problems.

Obviously, the greatest advantage of 16mm film lies in its low cost per reel. This holds true in each of the contemplated fields of application, whether industrial, educational or home entertainment. On the other hand the factors that permit this low cost, namely, narrow gauge and low film speed, are the very features that present the most severe technical difficulties in the problem of producing sound from such film.

Were it not for these difficulties there would be very little occasion to discuss standards for 16mm film. Since the 16mm field must always depend in a large measure upon 35 mm sources, it is obvious that the most attractive standard would be a simple reduction from standard 35 mm sound film in the appropriate ratio 1 to 0.4. A discussion of the penalties involved in any departure from this standard is, therefore, pertinent.

It is evident that the difficulty of resolving the higher frequencies from any film varies inversely as the film speed. For example, a frequency of 6000 cycles on a 16 mm film, moving at a speed of 24 frames per second (36 feet per minute), is equivalent to a frequency of 15,000 cycles on a standard 35 mm sound track. It must be admitted that if such a 16 mm film were to provide only 40 per cent as good quality as was available in the theatres at the time 16 mm development began, the results would be highly unsatisfactory. It is not surprising, therefore, that many of the early workers in this field devoted much thought to the possibility of relatively higher film speeds for 16 mm. Among the many suggestions that resulted were several that contemplated film speeds of 32 feet per minute, obtained by projecting alternate frames, and others in which the picture is turned through a right angle and the perforations spaced further apart to obtain speed ranging from 45 to 90 feet per minute.

Although each is technically feasible, none of these suggestions are economically practical, most of them being limited by lack of flexibility in production or by excessive film cost. As time passed and as these limitations were more acutely realized, there remained no doubt of the desirability of a simple reduction from existing 35 mm standards, provided only that the technical difficulties could be overcome and satisfactory results obtained.

Upon further reflection there appears to be some hope that satisfactory resolution of high frequencies can be realized from a film traveling at 36 feet per minute. While it is true that 4 to 10 of the quality even now commercially available in theatres would still be unsatisfactory, it happens that the film itself is by no means the only important factor in present day 35 mm quality. Recent work has demonstrated that the film is a very much better transfer medium for sound than much of the apparatus necessarily associated with it. On the other hand, the difference in quality between 35 mm and 16 mm film rests entirely with the capabilities of the film itself and of the optical elements associated with it, for the reason that microphones, amplifiers, light modulators, light-sensitive cells, and loud speakers all have characteristics entirely independent of the speed with which the film may move whether in recording, printing, or in reproducing sound.

In view of these facts, the developmental work here described was begun with the idea of adopting a film standard that would offer the simplest production methods at the lowest possible film cost, quite regardless of the technical difficulties to be overcome. Should it later prove that these difficulties were insurmountable or their solution not commercially feasible, some more favorable form of film layout could then be chosen more intelligently with a more accurate knowledge of the relative merits and penalties involved. This determination led naturally to the adoption of straight optical reduction of the present S. M. P. E. standard 35 mm sound prints. The results of this developmental work have been very gratifying in that this simple optical reduction of 35 mm sound prints to 16 mm sound prints has been justified as an entirely practical and very economical means of producing such film.

In making such a film, standard 16 mm film stock with 2 rows of sprocket perforations is employed, and the sound track occupies a place alongside the picture just as in 35 mm sound films. The relative dimensions of picture and sound track are practically identical, except that the slightly greater relative width of 16 mm film as measured between sprocket holes makes it possible to allow proportionately larger unused margins on either side of the sound track, if desired.

On the other hand, the Society has already had occasion to consider a film layout in which it is attempted to obtain a wider sound track without widening the film, at the sacrifice of one row of sprocket holes. Of all the suggestions that have been made for 16 mm film layouts, only this and the simple reduced standard have been seriously considered for standardization by the Society, and it seems appropriate, therefore, to make direct comparison of the essential features of each.

Fig. 3 shows direct optical reduction of sound and picture on a standard 16 mm film having the usual two rows of perforations and in all dimensions identical with the film

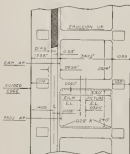


Fig. 1. Optical reduction of sound and picture on standard 16mm film.



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Sound on 16 mm. Film

Continued from Page 33

a satisfactory picture of the dimensions proposed. It will normally happen that the original 35 mm. negative from which it is desired to obtain a 16 mm. print will be a sound picture negative, because of a desire to use the same subject for 35 mm. applications. In such a negative, the picture is displaced to one side of the film to accommodate the sound track, and there are substantial spaces between successive frames. Consequently, it is impossible to use such a negative in a running reduction printer to produce the film layout shown in Fig. 2, since it would, in fact, produce precisely the arrangement shown in Fig. 1. This is due to the requirements of all such printers that the mechanical motion of the films and optical motion of the images must exactly correspond. If, on the other hand, the original negative is placed in a stop reduction printer and the optical ratio is changed to "blow-up" the picture to the size shown in Fig. 2, the negative will be subjected to the dangerous wear and tear imposed by such printers. It is necessary, therefore, to make a duplicate negative of the picture whenever any considerable number of prints are required, and when stop printers are used, a number of such negatives will be necessary to accommodate production on any considerable scale.

In contrast to these difficulties, the layout of Fig. 1 affords the greatest ease and flexibility in production. A single printer may be used for either sound or picture, and, in the case of combination negatives, for both. It is ready at a moment's notice to produce a sound, picture, or combination print from the original negatives without the delays attendant upon duplicating and re-recording. The method may be applied with equal facility to any number of prints, whether one, a dozen, or several hundred, with quite negligible depreciation of the negatives. In practice it has been found possible to operate such a printer at speeds as high as 60 feet per minute of 35 mm. film, and speeds of 90 feet or more may be expected. In consequence the number of such machines required to equip a film laboratory for quantity production will be very small and a capital investment may be held at a minimum.

The projection problems surrounding the two types of film under discussion present similar comparisons. Most users of 16 mm. film are familiar with the tearing of the sprocket holes that often occurs when operating ordinary silent 16 mm. projectors, and considerable doubt exists as to whether a single row of sprocket holes could be expected to endure under the even higher projection speeds

required for sound film operation on 16 mm. In 35 mm. film, 8 sprocket holes per frame are employed, and the film is handled by skilled operators. Under such conditions satisfactory film life may be expected, but there is a vast difference between these conditions and those that the 16 mm. film will encounter in home, school, and office, where the equipment must be operated by persons not necessarily mechanically inclined, and the provision of only one sprocket hole per frame seems very dangerous.

The difficulty of mechanically supporting film of the type shown in Fig. 2 without scratching the sound track area has already been mentioned. In contrast, the layout of Fig. 1 provides ample support on either side of the film. It is often desirable to arrange a machine for alternate use with translucent and reflection screens, and with the film of Fig. 1 the required picture inversion may be accomplished by reversing the film in the gate. With the film of Fig. 2 this is obviously impossible, as the sprocket teeth would then engage the portion occupied by the sound track, with disastrous effect on the latter. For such a film, the needed inversion must be effected by a relatively expensive optical device.

As in the case of sound track width, the somewhat smaller picture area available in Fig. 1 is of considerably less importance than appears from first observation. With a given subject and identical film stock, the pictures resulting from these two diagrams may present discoverable but by no means serious differences. Current developments in finer grained emulsions by this organization and others may soon be expected to yield picture quality which is beyond reproach in either diagram, 1 or 2.

Projectors designed to accommodate either of these sound films are also capable of projecting any existing silent films that the owner may have in his library. In the case of Fig. 1 a lever is provided to change the aperture size from sound to silent dimensions, as desired.

The design of suitable machines to project 16 mm. sound films is perhaps as interesting a development as that of producing the film itself. When 35 mm. sound-on-film was first introduced in the theatre, no attempt was made to replace the original picture projector, but instead, the sound reproducing means was provided as an attachment to the picture projector. The considerable dimensions of the 35 mm. film, and the fact that one or two inches of 35 mm. projector comprised the bulk of the field, made this arrangement feasible. In the 16 mm. field, however, the problem was quite different, for the dimensions of the film are small, the number of different makes of projectors



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quite large, and the cost of adding sound to an existing projector, if possible at all, would be a relatively large portion of the cost of manufacturing a complete machine.

Furthermore, most of the 16 mm. projectors now in use were designed without special thought as to quietness of operation. In the 35 mm. field, quietness is not an important item, since the projection apparatus is all enclosed in a fire-proof booth which may also be reasonably sound-proof. On the other hand, 16 mm. projectors are normally operated in the same room with the audience, and if noisy, they must be enclosed in suitable sound-proof cases, which may be quite expensive. For this, and other reasons, it becomes highly desirable to design a 16 mm. sound film projector as a complete unit, and to take such steps as will insure quietness of operation, not only initially, but throughout its life.



Photographing Through a Reading Glass

Continued from Page 28

enclosure he was using with a telephoto as the work he was doing was within inches of the object at all times. He needed a nice close-up of that old silkworm to give him just what he wanted and was pondering how he would get it without investing in some more lenses, when the reading glass lying on the library table came to his mind and he felt it would at least be worth the experiment.

Holding the reading glass about five or six inches away he pressed the button, and the results were fine. Here a bit of good old American ingenuity not only gave him what he wanted, but must have given Powell a wonderful thrill to think that he solved a knotty problem in a very simple way. For a thrill it must have been as good as a golfer making a hole in one.

We are reproducing a few enlargements of Powell's picture. The one showing the eggs was taken at two inches. The eggs were just ready to hatch. He endeavored to get that action, but the slow motion, and a lot of it, wasn't just up to his preference that day.

The other photo is an enlargement of the close-up scene taken by him through an ordinary reading glass at about a five or six inch focus.



Club's Monthly Contest

THE Los Angeles Amateur's Cine Club conducts a monthly contest giving prizes for the best 400-ft. or less picture submitted to the membership. These contests have been going on for several months. A grand prize will be offered in December by the club to the first winners of the monthly contests who submit what is considered the best picture. The picture entered in December must be entirely different from the subject for which they were awarded a monthly prize.

The winner in the August contest was W. W. Seaman, who presented a very clever and excellently photographed picture entitled "Africa Squeaks." The second prize was awarded to F. B. Skelton for his "Bear Hunt" in which his 3-year-old son was the "hero."



Cameramen and Newsreels Sign

● The cameramen's unions in New York, Hollywood and Chicago have signed a year agreement with Pathé News, Fox Movietone, and Hearst Movietone. It is claimed this move will settle all labor difficulties. Paramount News is expected to sign. Negotiations were conducted by Pat Casey for the Newsreels. The agreement calls for a minimum wage of \$90.00.

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In the Laboratory

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square law. Hence for any setting which has been made to equalize the brightness of the two fields after the insertion of the photometric density is one of the two beams, the magnitude of that density may be directly computed.

This device which we have just defined at length is only the optical part of a densitometer. Around this must be constructed a satisfactory instrument to allow for the precise measurement of photographic densities. This consists of an aluminum casing which forms an almost cubical box in which is placed a high wattage incandescent electric lamp. The top of this box is formed by a sheet of bakelite in the center of which is mounted a disk of white pot opal glass slightly larger in diameter than the nosepiece of the Martens polarization photometer head. The incandescent lamp is placed directly below this opal glass window in such a manner that the opal glass is uniformly illuminated to a relatively high level. The photometer head is mounted on the swinging arm shown so that in the reading position it is directly above and centered on the opal glass window. A metal slide is mounted transversely on the top of this lamp housing and in this slide operates a holder carrying the sensitometric strip to be measured. This is so arranged that the sensitometric densities pass under one of the apertures in the nosepiece of the photometer head, while the other aperture is covered by a portion of the photographic material which has received no exposure but which has received the same development as the sensitometric exposure. In this manner the fog is automatically subtracted in the act of reading the density. In other words, the density of a sensitometrically exposed area is read in terms of the density of an area of the photographic material which has received no exposure in the sensitometer but which has been subjected to development. It is of course possible, if desired, to arrange the holder and the sensitometric strip in such a manner that density is read over the edge of the sensitometric strip and in this manner values of sensitometric density plus fog are obtained. The surface of the photographic emulsion during reading is in contact with the surface of the white pot opal glass. Hence density values obtained in this manner are those of diffuse density and consequently practically identical with the effective printing density of the deposit, provided, of course, the deposit has no selectively absorbing characteristics.

American Equipment Not Popular in Estonia

IT is the claim of the producers of Estonia that because it is impossible to secure information as to whether or not European service is provided by any of the American manufacturers of sound reproducing equipment the German brand is making the greatest headway. Germany and all German manufacturers are said to provide good service through resident agents who employ expert engineers.

DeVry takes over Q. R. S.

ACCORDING to an announcement from Herman A. DeVry, Inc., of Chicago, that concern has purchased the Q. R. S. DeVry Corporation of the same city and will conduct its business from the address of the latter corporation.

The announcement states that it is the plan of the DeVry Corporation to increase its manufacturing schedule. In addition to continuing the DeVry Sound-On-Film Projector the company will also make sound heads for theatrical machines, amplifiers, public address systems and a recently developed 35mm. sound camera complete with amplifier for the popular market.

The 16mm. field will be entered into with a complete organization to handle service and repairs.

Lighting With Paint

Continued from Page 8

markable, despite the fact that such effects are so common as to be used in almost every feature produced.

It seems almost incredible that the advent of sound could by any stretch of the imagination have affected the work of the scene-painter, yet such has truly proven the case. In the first place, of course, the addition of sound necessitated in many studios radical changes in the materials used for set-construction. These, in turn, naturally affected the painter, for a paint that will adhere perfectly to wood or plaster-board may not be at all satisfactory for use over music or burlesque. At the R-K-O studios, for instance, we had to develop a special paint. This is more properly a plaster, as it is applied like plaster, on the stretched burlap of which our sets are now constructed, and applied with either a brush or a trowel. This new material has enabled the scene-painter to aid not alone the cinematographer, but also the recordist, for the new paint serves to confine the high frequency sound-waves to the set, while letting the lower frequencies pass, greatly improving the intelligibility characteristics of the record. Laboratory tests have shown that the new paint confines about 40% of the high frequencies. This improves the tone-quality in long-shots especially, and eliminates all of the boom and echo characteristics of the set.

The question of reusing existing sets for further use is in these days of stringent economy, a vital one, and one in which the scene-painter plays a vital part. For a long time, of course, it was regarded as almost criminal to even think of making a set do duty in more than one feature picture. Lately, however, it has been found that the public can seldom recognize a set if it is properly revamped—the geography slightly altered, and the entire set more or less repainted. If the entrance to a set is changed, or a door or window moved, added or removed, the set re-painted and re-decorated, it is almost impossible to recognize it on the screen.

Color pictures are comparatively infrequent of late, but they require unusual artistic sense and diplomacy from the scene-painter. Contrary to the general belief, color pictures are harmed rather than enhanced by too much color in the set itself. For the best results, the sets for a natural-color production should be painted exactly as though they were intended for a normal black-and-white film, for it is the lack of bright colors in the set that makes for the best color-effects on the screen. With the settings in subdued tones, the brighter colors can be carried by the costumes and dressing in color, as in many other things, it is not so much what you do that is important as is what you do not do. If your entire picture—set, dressing and costumes—is a riot of color, you cannot expect to get artistic, satisfying color-effects on the screen, for each detracts from the impression given by the others, and the combined effect is confusing and hard to look at. In a colored film, even more than in a black-and-white, the set must be above all a background for the action.

The art-director, of course, designs his settings with this in mind. It is his aim to make the sets individually inconspicuous, yet none the less to make them aid in telling the story. But his hands are tied if the man who paints the sets does not understand the ideas the sets are to express. The cinematographer, on the other hand, is equally handicapped if he and the art-director cannot work in complete accord. The scene-painter is often the direct link between the two, he must know what the art-director is trying to express—and how to paint the set so as to express the art-director's ideas, and at the same time give the cinematographer a truly photogenic setting with which to work, painted in the right tones and shades to make possible the effects desired, and with the various shadings, high-lighting and spots of light which will make it easiest to photograph the picture.

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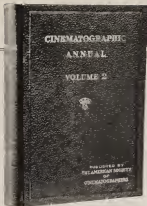
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Hunting "Movie" Goats

Continued from Page 51

back—but it was no time to think of pictures, anyway. I grabbed my rifle, and shot him in the mouth with a steel-nosed bullet. He fell in his tracks, from the empty shell to where he lay was but thirteen short steps. He was a beautiful specimen—a wonderful trophy. I only wish that I could have had a chance to shoot him with a camera as well as with a rifle. I quickly skinned him, and, leaving his hide in a tree, I continued on after my goat-films.

It took me four hours to climb up to where the goats were, but once up there the hunting was good. They were not particularly camera-shy and I managed to get a variety of scenes showing their natural habits and surprising climbing ability. Most spectacular of all was one shot I made of one of the goats scaling the side of a steep gorge, the walls of which ran a thousand feet straight up and down 'What Mr. Goat was walking on! Heaven only knows! But he did it—and my film will prove it, for I got some excellent shots of the action.

Soon now I will be going farther back, where the beautiful Dali Rams are. I am sure of close-ups of these creatures and I'll also stalk a grizzly or two, with camera in one hand and gun in the other. Hereafter, I have always connected with grizzlies without a camera—but now for a picture!

Surely this is one of the greatest pleasures that life can afford—going into the beautiful, wild, mountain ranges in search of moving pictures. What wonderful things a fellow can see up here! To be camped above Timber Line is a joy indeed—clouds majestically float by far below, and the hillides are dotted with walking snow, which, on closer inspection, proves to be the snow-white Dali sheep and goats, feeding, feeding—and eternally watching. Creeping upon them unawares demands even greater stealth and woodcraft than does hunting, for while you can kill from a distance, you must be close by to get a good picture. It is harder—but infinitely worth all of the trouble and disappointments for a photograph—especially a moving picture—will live forever, and enables you to share the thrills of the chase with all of your friends. It is a rough life and a hard one, living and making pictures up here, but I would hesitate to change places with a king—or even with one of those professional cameramen from Hollywood who are in Alaska now making pictures of the life up here at the Top of the World.

▲

Camera Department Maintenance

Continued from Page 7

Moreover, the studio and its executives would have a complete and easily obtained close-record of every item of experimentation undertaken. They could know just what was feasible, and what was not, what developments proved impractical, and what reached the completed stage and saved money in production. There would be, too, a decidedly greater opportunity for practical research and development work—and no industry can prosper unless such experimental work is constantly under way, not alone by the equipment manufacturers, but by the practical users of the equipment.

Finally, let me point out a matter of personnel which is overlooked in all too many studios. Practical experience both in the Paramount Studio, and in several others which have followed the same practice has proven that a camera department operates most efficiently when it is headed by a cameraman. I realize that there are several camera department heads who have achieved a considerable degree of success without this practical photographic background, nevertheless, this lack imposes a considerable handicap. In my own case, I know that I would have been definitely hampered had I not been a production cameraman for more than fifteen years before entering the executive duties of

camera-department head. Only by actual photographic experience can one be fitted to handle such diverse questions as that of office necessities. In my own case, I spend a great deal of time in viewing the rushes of every unit, and in personally visiting each set, so that I know just how and under what circumstances each crew is working. Thus having a background of practical camera experience, I am frequently able to aid my associates. I can judge accurately whether they, the director or the laboratory is responsible in the event that certain takes fall below par. I can more efficiently routine maintenance, and more accurately judge the value of any projected experimental work. What is most important, there is a very definite point of contact between the department head and the cameramen in his department: they know that he speaks the same language that they do, that he understands their problems and aims. Therefore, they have greater confidence in him, as a cameraman, than they would were he merely an executive. Thus the morale of the department is kept at a higher standard—and in these days, there must be two paramount considerations in studio operation—efficient operation, and the maintenance of the highest possible morale among the personnel of every department.



A. S. C. to Test and Approve

Continued from Page 3

coming so quickly it is felt the time is practically here when standards will have to be set, especially in sound-on-film practice. The amateur is in many instances, wondering how soon his present equipment will be demoted.

There are said to be about three classes of amateurs. The first, known generally as the "snap-shooter," who is treating his picture camera the same as the ordinary user treats his still camera. He makes no special effort to secure good photography and effects, but is satisfied with getting something of the event he is shooting. The second class is the man who has not gone in for elaborate equipment but possesses what he considers sufficient for him to learn the fundamentals of cinematography, and is traveling slowly until he is sure he is qualified to use the more complicated apparatus. The third is the one with whom Cinematography is a deep seated hobby. He has gone at it in earnest. Eager for knowledge, watching every bit of new equipment offered, trying seriously for his own pleasure to get the best photography possible, the best effects, and in every way endeavoring to turn out a creditable amateur production.

Should equipment be designed for any one of these three classes it will be given consideration from that stand point in the tests and will have to meet the specification laid down at the time of testing for its class only.

Tests will be made as rapidly as possible consistent with thorough and honest work. They will be made in the order in which applications are received in the various types of equipment.

When an article has been approved a certificate of approval will be sent the manufacturer for the model tested together with permission to stamp that article with the approval of the American Society of Cinematographers. The manufacturer will agree to use this approval only in the manner specified by the American Society of Cinematographers.



Fineman to Produce

SHOULD the plans being formulated by Al Fineman and M. A. Chase, exchange men of New York City, a new producing company will be launched with Fineman at the producing helm, while Chase will take over the distributing duties with headquarters in the east. Hollywood will be the site of the producing activities for six features this coming year.

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Alcohol on By-Product "Spre"

Continued from Page 32

The growth in the importance of cellulose acetate film has emphasized the relationship of the film industry to a recent rapid chemical development.

Cellulose acetate film is more than twenty years old, but its adaptation to important uses dates back less than ten years. Within that period the chemical world has been busy maturing other forms for cellulose acetate. The film maker's subsidiary founded to supply wood alcohol is now making cellulose yarn as well. Transparent wrapping material likewise is taking its place beside film as a utilization of cellulose acetate—and the number of commercial objects that may be moulded from plastic cellulose acetate is unlimited.

Cellulose nitrate—the son of film material—has acquired some cosmopolitan cousins, too, during its long career. Leathers, artificial leather and window curtains for automobiles are only a small minority of limbs from that family tree. Perhaps the novelty of cellulose acetate chemistry, and the fact that it makes more products that look less like film, provides the current industrial glamor of this new al-chemical realm.

The very fact that film chemistry is looking aside from its constituted line of achievement—and that this article ends with the mention of things apparently far remote from the main theme of film making—points to one magnitude of the film industry, and to the unceasing need for alchemists both in the strictly technical and in the economic phases thereof. The crying need of the motion picture industry today is for better and less costly pictures, and it is through such convoluted sources of supply and through the exploration of its non-photographic by-products that the film manufacturers are doing their part, and giving to the industry a better film, at a lower cost than ever before.

More Silence Please

Continued from Page 17

gallow" has its main frame work made of 1/2 inch fiber board held together by thin aluminum angles bolted by tiny machine screws and nuts. The main section measures approximately 17 1/2 inches in width by 31 inches in length. This section is 13 inches high. The space for the camera magazine is 7 inches wide and 10 inches high and was so designed that the "blimp" can fit only when the camera is in photographing position. This latter section is 26 inches in length and is flush with the back of the blimp. A sheet of optical glass 13 3/4 inches by 9 inches which is held by felt covered aluminum strips serves as a photographing window. This area allows the use of a 35 mm. lens. There is also a window of good quality glass in the rear of the blimp which permits the cameraman to observe all action through the view finder. A door was also cut in the magazine compartment to check the camera take-up during a run.

The entire inside of this booth is covered with two layers of 1/2 inch felt. A lining of thin black cloth was also used to prevent felt dust from settling on the camera and the photographing window. The first or inner wall of felt comes 1/4 inch below the bottom of the fiber board while the second felt wall is 1/2 inch thicker. This construction forms a gravity seal with the bed when the blimp is placed in position. The outer surface of the fiber board is also covered with a layer of 1/2 inch felt which cleans the base of the blimp by 1 1/2 inches. This clearance permits a close fit between the outer wall of the blimp and the inner wall of the tray upon which it rests. Two strips of 1/2 inch angle aluminum with a metal handle on each end were placed lengthwise on each side of the blimp for strength as well as convenience in placing and removing the cover.

The construction features of this "blimp," needless to say, did not just happen, but are the result of several attempts to keep silence golden in our studio. Several other silencing devices have been attempted, but the present design permits use within four feet of the microphone with very little sound pickup. The greatest problem during construction was that of adhering the felt and rubber to the various surfaces. After several unsuccessful attempts with commercial glues and cements, we found G-E Glyptal Cement to be an ideal solution.

Special-Effects Cinematographer

Continued from Page 12

can be done with the camera, they will still stand out as obvious miniatures. In addition, they are more expensive than the simpler plaster casts.

The relation between the scale of the miniature and the speed of the camera is important—and intricate. It cannot be summed up in any arbitrary rule, but must come as the result of experience and observation which develop an intangible photographic sense. The scale used for miniatures usually varies between 1/2 inch to the foot and 4 inches to the foot, camera speeds may range from stop motion up to eight times normal. It would seem relatively simple to calculate the scale and speed of miniatures, but another variable is introduced by the question of the focal length of the lens or lenses to be used. In photographing a certain large miniature recently, we built the set to a scale of 1/2 inch to the foot, with eighteen cameras used to photograph the scene from different angles. The use of as many different lenses of foci ranging from 32mm. to 6 inches, the camera speeds varied between three times normal and eight times normal. Naturally, too different types of miniature scenes require different treatment, a ratio of scale, speed and lenses that would suit, for instance, an earthquake, would be utterly wrong if used for a flood. A ratio suited to a simple earthquake would likewise



be entirely unsuitable for use if the earthquake were followed by explosions. Marine miniatures, naturally, form an entire specialized subject in themselves, as do floods, explosions, and wrecks, in fact, every miniature is an individual problem in itself.

One of the most useful departments in a special-effects studio is the one which is devoted to optical printing. This is really the jack-of-all-trades of special-effects work. All fades and lap-dissolves are now made by optical printing, of course, as are the infinitely varying optical "wipes" now being so frequently used. But, more than this, the optical printer is often drafted to insert special effects not in any other way obtainable, or to salvage both production and truck shots which might otherwise have to be discarded. In a recent Joe E. Brown production, for instance, the script required the star to smoke cigars almost incessantly, and to blow smoke-rings. Now Brown does not smoke at all—and of course he doesn't blow smoke-rings. Therefore, the optical printer was called upon to supply both the smoke and the smoke-rings. In an article in the CINE-MATOGRAPHIC ANNUAL, Volume II, Lloyd Knechtel referred to a miniature train-wreck in which two different takes were combined with full-scale scenes, and in which the wreck was artificially sped up—all by means of the optical printer. In a recent film of our own, the optical printer was called upon to save some expensive retakes when it was found that one of the principal roles had been badly mistak. As it happened, during a long sequence played by practically the full cast of the picture, and upon a large and expensive set, this particular player was seated in a chair. It was, therefore, no surprisingly difficult matter to re-take the scene showing only the new player seated in the chair, and then to combine the two takes into a single scene by means of the optical printer—thereby saving some expensive retakes. Similarly, one of my friends in another studio used an optical printer to repair a split-second sequence in a picture in which the star played a dual role. In making the second half of this sequence, the camera was racked over too far after focusing, so that there was a considerable gap between the two halves of the take. Thanks to the optical printer, this was moved over to where it belonged, and blended with the other half of the picture, saving the company a large sum, and some intricate retakes.

A successful special-effects department should whenever possible maintain its own laboratory. Despite the perfection of the modern production laboratory, it is not fitted to handle the work of a special-effects department, which uses many different types of film—Panchromatic, Super-Sensitive, Orthochromatic, Positive, Master-Positive, and Duplicating Stock—and in which each individual scene requires individual treatment in the laboratory. Therefore, the only solution is for the special-effects department to maintain its own laboratory, a miniature plant, as perfectly equipped and staffed as the best production laboratory, but, naturally, with a far smaller capacity, and closer control of all operations.

As an inevitable consequence of all this, there is a highly important question of equipment maintenance to be remembered. The abnormally high operating speeds of special-effects cameras, and the fact that for special-effects work the camera must be constantly maintained in perfect operating condition, make this problem of maintenance a grave one. Special-effects cameras must, also, be considered as the highest type of precision machinery, for in many instances, cameras which have proven themselves perfectly satisfactory for production work have been rejected for use in special-effects work because of insufficient accuracy in their mechanical functioning.

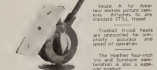
The special-effects cinematographer must, therefore, be like Kipling's marine—"a sort of a blooming cosmopolite." He must be a technician of a high order, an artist, and fully informed regarding the work and the personnel of

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every other department in the studio. Most of all, he must be enough of an executive to successfully coordinate the work of his department with the schedules of perhaps a dozen production units—and enough of a diplomat to work efficiently and amiably with the dozen different directors, writers, cinematographers and supervisors connected with those units. As a rule, he is all of these things; he wouldn't survive if he were not—and like the mariner, "you could put 'im ashore on a baid man's 'cad to paddle is own canoe."

Academy Appoints Technical Committee

In its preparations to select the winners in the various classifications set down by the Academy of Motion Picture Arts and Sciences in its annual awards of merit, Chairman Nugent H. Slaughter of the Technicians Branch has appointed his board of judges to review the technical and scientific achievements within the film industry.

Those appointed on this committee by Slaughter include John Arnold, A.S.C., J. A. Ball, Carl Oscher, Emory Muse, A.S.C., K. F. Morgan, Maurice Prior, Max E. Parker and J. M. Nickolaus. Chairman Slaughter is an ex-officio member of the board.

Paramount to Issue Newsreel in France

According to reports emanating from Paris, a special organization to produce a French newsreel is said to have been completed by Paramount at its Jamelle studios.

The plans are understood to include the sharing of this service on the continent jointly with London which until now has been headquarters of the whole of Europe. E. B. Descond is mentioned as editor of this animated news project.

Expert Interprets Electrical Tax

Electrical energy used by motion picture theaters in the projection of pictures, lighting of signs and display boards, and in the lighting of the building, etc., is subject to the 3% electric tax, under a ruling just issued by the Tax Department according to J. S. Seidman, tax expert of Seidman & Seidman, certified public accountants.

"The law," Mr. Seidman explained, "provides for a 3% tax on the amount paid for electrical energy used for domestic or commercial consumption. Electricity used for industrial consumption is not subject to tax. The question arose whether electricity employed in the operation of the motion picture theater business is commercial in its scope or industrial. The decision of the Tax Department is that it is commercial and therefore subject to tax.

"Another ruling that will be of interest to the motion picture industry," Mr. Seidman added, "has to do with

the tax on radios and phonograph records. It is held that phonophone sound systems for recording and reproducing sound in connection with motion pictures are not taxable as such. However, if electrical transcription records or phonograph records are used in such sound systems, they are subject to tax."

Biddle Me This

Continued from Page 36

ARTHUR EDISON, A. S. C. I've made pictures both ways, but I much prefer to make my interiors on location—if I've got a picture that permits it. Of course, it can't be denied that it's harder work that way—but the results justify it. On the other hand, you have more complete control of your lighting if you make your interiors on the stage—but we can't yet control our lighting so that we can make artificial light look like daylight. So—especially if I have a well-designed set and a capable director—I prefer to make my exteriors and interiors together—out of doors.

JOHN F. SEITZ, A. S. C. To my mind the question depends entirely upon the nature of the picture in hand. On some, the slightly artificial effect of studio-made exteriors might be entirely fitting, but in most cases I really prefer to have the important interior sets for a picture built out doors, as practical parts of the major exterior settings. We did it in "A Passport to Hell," which I recently photographed, and the results, I think, are decidedly better than could have been obtained had we tried to make the exteriors on the studio stages.

RAY JUNE, A. S. C. I have worked both ways, according to the needs of the particular production in hand. As a rule, I prefer to make my exteriors on the stage rather than vice-versa, for I feel that this method has both artistic and commercial advantages. In the first place, of course, working indoors the cinematographer has a far more perfect control of his lighting and other effects. Secondly, working in this way, the company is completely independent of natural lighting and weather conditions—an important consideration at any time, but especially so at this season. Then, too, with the perfection of the transparency-projection process which is now used so frequently, it is possible to eliminate many arduous and expensive location trips. Lastly, working under the familiar and perfectly-controllable conditions of the studio stage, the entire unit works more efficiently. It goes without saying, of course, that the company which is able to turn out the most scenes per day, while maintaining the artistic and technical standards required, is the most efficient in these days of high negative-costs and low profits.

As a proof of my feelings on this subject, I might add that we are planning to handle the production of Mary Pickford's forthcoming production, "Shanghai," in this manner. Working constantly on the stage I am confident we will secure better results, and secure them faster and with less expense than could be possible in any other way.

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Yates Champions Commercial Lab

IN an announcement issued by the Consolidated Film Industries Inc., Herbert J. Yates, president of that corporation, claims the independent laboratory more efficient than the studio operated plant.

"Producers who have refused to be influenced by their own or other's prejudice," stated Yates, "and have studied the actual facts have found that a definite loss is incurred in operating their own film laboratories. Due to the nature of the film laboratory this is inevitable."

It is Yates' contention that one of the strongest needs of the motion picture industry at the present time is specialization because specialization makes for economy which is much needed at this time. "These are days," said Yates "when the curbing of all unnecessary expense may mean the early return of operating the industry on a profitable basis. The attempt on the part of some producers to produce, distribute, exhibit and print their own pictures has cost them millions."

A higher quality of prints, the relief of thousands of burdensome responsibilities, and a more prompt service are some of the points which Mr. Yates cites in behalf of the independent laboratory. He argues it is a wasteful extravagance for a producer to maintain a film laboratory with a capacity that at all times accommodates a peak volume of quality printing, either quality or performance suffer or the cost is prohibitive.

"A well equipped commercial plant," claims Yates, "whose business from various sources flows in steadily enables them to employ a full complement of help throughout the year. Delays and poor quality are the penalties paid by organizations where employment is not continuous."

"To the producer, making pictures is the all important thing. To the film laboratory, making prints. As a consequence, the film laboratory is ceaselessly seeking the means by which to advance the science of printing."

"Only specialization," concludes Yates, "with the steady flow of business that it brings in from multitude of sources, together with a determination to produce the best at the lowest possible cost, can achieve the most efficient and economical results."

Hoover to Campaign Via 16 MM

ACCORDING to reports emanating from the east, it is claimed the Herbert Hoover for President picture which has been produced as a part of the Republican campaign will also be available in 16mm on sound.

Whether the Democratic party will follow the lead of the Hooversites to reach this vast audience of 16mm users has not been determined. The Republican party seems to realize the importance of this field, and the undivided attention their message will receive in this form right in the home of the viewers where they have possibly assembled many friends for an evening of entertainment.

R-K-O Trick Departments Consolidated

WITHIN the past few weeks the trick and special photographic departments of the R-K-O Studio have been united, under the management of Vernon Walker, A. S. C. Lloyd Knechtel will remain in charge of special optical-printing effects, glass-shots and miniatures, while Lynn Dunn will continue to handle the making of routine optical-

printer effects, such as fades, lap-dissolves, "wipes," and dupes. Mr. Walker, in addition to being the department head, will have personal charge of all process cinematography, including transparency and projection shots.

This move, according to R-K-O officials, has been made in the interests of economical operation and efficient production. Heretofore, with several departments handling the different phases of the work, the responsibility was divided. The present consolidation of the studio's special-effects departments is planned to remedy this, and to give to each of the technicians involved better opportunities for concentration upon the highly specialized work in which they are engaged.

Jansen Offers Complete Studio

W. H. Jansen, A.S.C., managing director of Industrial and Educational Films, Inc., of Shanghai, China, in a recent report to the Production Committee of the American Society of Cinematographers, states that his firm is now equipped to offer to American producers and cinematographers complete studio and laboratory facilities comparable to those obtainable in Hollywood. Aside from complete camera and recording equipment, these facilities include a 70x120 ft. sound-stage, a sound-equipped projection-room, and a modern laboratory for processing both black-and-white and Multicolor film, using machine-development and fully air-conditioned. The plant is staffed entirely by American and European technicians.

Mr. Jansen states that for the past ten years all cameramen passing through Shanghai have made his establishment their home while operating in China, and that the facilities of the studio are at the disposal of any producers sending either crews or complete units to the Orient.

Vatican to Study Movie Making

The priests of France and Germany report that the Pope has appointed a delegation to visit Hollywood with a view of studying the methods and manners of making pictures in vogue in America.

It is reported this committee will make a thorough study of the technical phases in operation in the United States. Seemingly it is the intention of the Vatican to produce pictures showing the early history of the Catholic Church and also other subjects depicting the lives of its great leaders and saints.

Raw Film Production in Russia

A press report from Soviet Russia states that the raw film factory, Schostenskaya, has turned out 2,000,000 meters of raw film and the "Penzaslavskaya" more than 1,000,000 meters of raw film. Under the five-year plan these two factories are expected to supply the entire raw film requirements of Soviet-Russia.



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Thou Lees of Critic

Continued from Page 18

does the best that he can under the circumstances, and in the few scenes where the camera is not staring all over the studio, shows excellent form; but in the major part of the film he is overwhelmed by the director's penchant for traveling by dolly.

There is, however, a sequence in a Harlem negro nightclub which is so fine as to almost redeem the picture. The various optical transitions, executed by Lloyd Knechtel, are also excellent. But in the main, the picture is Roy Hume's valiant struggle against the imponderable odds imposed by a director who should have known better.

"THE MONKEY'S PAW."

photographed by **Leo Tesser**.

THIS is yet another example of artistic effect-photography in a mystery-horror film. A twin-horored British story, played by a British cast, this film might, except for Tesser's cinematography, have been made in death do Lunnon. But I have yet to see the British film that is so excellently and tastefully photographed as is this American-made "quota film."

"MADISON SQUARE GARDEN."

photographed by **Henry Sharp, A. S. C.**

HERE is a very mild picture which, thanks to a director who appreciates the meaning of photographic good taste, is a really fine piece of photography. The story and its locale allowed Henry Sharp no opportunity for anything but good, straightforward commercial photography, but he was able to deliver it without hindrance. His lightings and compositions, while necessarily not pictorial, are natural and effective. The major honors of the production, however, must be awarded to Farciot Edouart, who has contributed some magnificent process photography. Approximately 65% of "Madison Square Garden" is process work but so perfectly done as to defy detection, even by experts.

"ALL AMERICAN."

photographed by **George Robinson**.

HERE is still another sports picture, one in which the photography, as always in such films, must inevitably take second place, but one in which the camerawork is extremely well-done, none the less. I would commend this especially to amateur cinematographers who are planning to film football games this season. The viewpoints chosen for many of the football shots are similar to those of the man in the stadium, with a little study, the 16mm football fan can easily glean a number of excellent pointers on how to film football, quite aside from the routine hints of "Use 32-speed and a telephoto lens."

AN APOLOGY

LAST MONTH, in discussing "Love Me Tonight," we stated that the picture seemed to have been photographed in far too low a key for the light nature of the story. Since then, we have seen the picture again—a different print. We must transfer our criticism to Arch Heave, who showed the press a print which was not up to the Paramount standard, and to Roy Wilkerson, of the Paramount Laboratory, who for almost the first time in history, turned out a poor print. Our apologies to Messrs. Milner and Mamoulian.

I Meet the Cameraman

Continued from Page 9

This is most unjust—especially so because our cinematographers so seldom fail, no matter how impossible the odds against them.

No words can possibly tell how greatly we who work in front of the cameras are dependent upon the cinematographers. It is not merely that they have it in their power to make us appear beautiful or otherwise on the screen. All of us, of course, naturally want to appear at least reasonably near our best, but that is the least of it. First of all, we are actors—and we must be mentally free if we are to do our best work. If we must be eternally thinking of our appearance, we cannot play our parts as we should. We cannot be existentially thinking. Now, I mustn't do this—it won't screen well. . . . I mustn't do that—it photographs badly. . . . I mustn't turn that angle to the camera—it's bad. That I think, is the secret of the success of such superlative artists as "Oliver" Marsh, instead of issuing a long string of "Thou shalt nots" to his stars he smiles, and tells them to go ahead and do anything that the part requires—and let him take care of their appearance. As a result, the star forgets everything except playing the part for all it's worth. Once you have such a sense of psychological freedom, you're twice the actor that you'd be otherwise. At least, I found it so in the picture that I have just finished with Mr. Marsh, he told me to forget everything that I had supposed I shouldn't do. Therefore I did—played the part as freely as though I were on the stage. I forgot that such a thing as a camera existed. I raced all over the set—screamed—laughed—was hysterical and angry as the part required. In short, I forgot completely that I was being photographed. The result is a marvelous tribute to "Oliver's" genius both as a cameraman and as a psychologist. I really looked human in the picture—and I was able to get my teeth in the part, as the saying is, and turn in a performance that didn't in the least resemble the camera-shy Tallulah Bankhead of the past. But—hidden down deep behind "Oliver's" mastery of psychology was a tremendous skill at photography, and ingenuity that saw and used angles that everyone else had thought impossible. I am not an easy person to photograph, I have a few good features and angles jumbled up among a number that were certainly not planned for photography, but throughout the picture Oliver Marsh made me appear as perfect as though every feature had been expressly designed for the camera. In addition, his lighting and general photographic treatment matched the mood of every scene perfectly despite the many contractions that I know he must have made to making me beautiful.

Many of my friends on the stage—people who have never had any experience in the films—have said that the cinema is not art, but a mere mechanical craft. That may be so, but in the cinematographers there is undying evidence to the contrary. In my brief career in the films I have learned that there is more—far, far more—to cinematography than the mere mechanical operations of setting up lights and grinding a camera. From my own personal experience I can testify that the achievements of the cinematographers are art in the highest and best sense of the word. More than this, I have come in contact with an entirely new standard of devotion, of cooperation and of patience. What words are there to express the admiration that I have for these unassuming men who achieve so much, who are constantly, patiently working when all of the rest of us are resting between scenes, and who exemplify such a fine standard of loyalty and friendship as do the cameramen? Yes, I am proud to know them, to have worked with them, and to add my small mass of praise to the tribute they so richly deserve—and so infrequently receive.



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